

CALIFORNIA  
ENERGY  
COMMISSION

# CALIFORNIA ENERGY DEMAND 2008-2018 STAFF DRAFT FORECAST

## STAFF DRAFT REPORT

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Arnold Schwarzenegger, Governor

# CALIFORNIA ENERGY COMMISSION

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# ABSTRACT

This document describes California Energy Commission staff's draft forecasts of 2008-2018 electricity, peak, and natural gas demand for each utility planning area in California. The staff *California Energy Demand 2008-2018* forecast supports the analysis and recommendations of the *2007 Integrated Energy Policy Report*, including electricity and natural gas system assessments and analysis of progress toward energy efficiency, demand response, and renewable energy goals. The final energy and peak demand forecasts for the respective territories of the state's three investor-owned utilities —Pacific Gas and Electric, Southern California Edison, and San Diego Gas & Electric—will be used in the long term procurement process at the California Public Utilities Commission.

This forecast was produced with the Energy Commission demand forecast models. Both the staff draft energy consumption and peak forecasts are slightly higher than the previous Energy Commission ten-year forecast, prepared for the *2005 Integrated Energy Policy Report*, over the entire forecast period, primarily because both weather-adjusted peak and electricity consumption were slightly higher than previously forecasted. The draft forecast has a higher growth rate (1.2 percent versus 1.1 percent) because of higher projected demand in the residential and commercial sectors.

## Keywords

Electricity demand, electricity consumption, demand forecast, weather normalization, annual peak demand, natural gas demand, self-generation, California Solar Initiative.



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## EXECUTIVE SUMMARY

# Introduction

This California Energy Commission staff report presents forecasts of electricity and end-user natural gas consumption and peak electricity demand for the State of California and for each major utility planning area within the state for 2008-2018. The staff *California Energy Demand 2008-2018* draft forecast supports the analysis and recommendations of the *2007 Integrated Energy Policy Report* including electricity and natural gas system assessments and analysis of progress toward energy efficiency, demand response, and renewable energy goals.

## Statewide Forecast Results

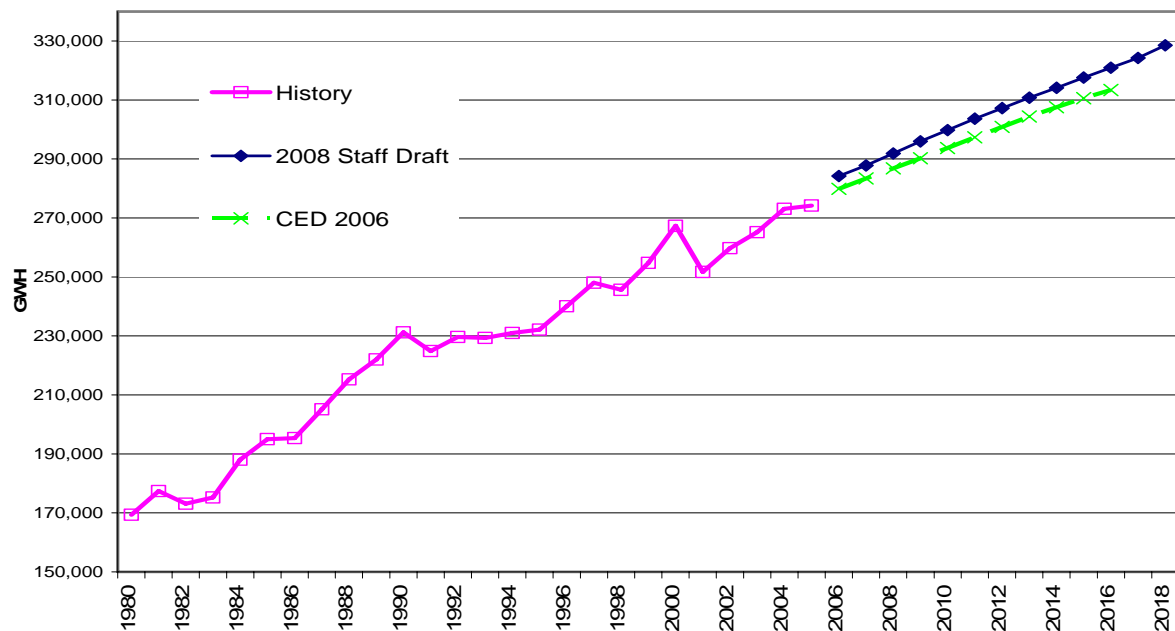
Table ES-1 presents a comparison of the staff draft forecast for select years with the final forecast used in the *2005 Integrated Energy Policy Report*, published in September 2005. Both the staff draft energy consumption and peak forecasts are slightly higher than the previous forecast over the entire forecast period, primarily because both weather-adjusted peak and electricity consumption were slightly higher than forecasted. The draft forecast has a higher growth rate than the previous forecast (1.2 percent versus 1.1 percent) because of higher projected demand in the residential and commercial sectors.

**Table ES-1: Comparison of 2005 and Staff Draft Forecasts of Statewide Electricity Demand**

Consumption (GWH)				Peak (MW)		
	2005 Forecast	Staff Draft	Percent Difference Staff Draft/2005 Forecast	2005 Forecast	Staff Draft	Percent Difference Staff Draft/2005 Forecast
1990	229,375	228,473	-0.39%	47,431	46,646	-1.65%
2000	265,021	264,229	-0.30%	54,028	53,127	-1.67%
2005	276,012	270,742	-1.91%	58,546	58,023	-0.89%
2008	286,813	288,370	0.54%	61,042	62,327	2.11%
2013	304,400	307,308	0.96%	65,144	66,449	2.00%
2016	313,397	317,477	1.30%	67,379	68,804	2.12%
Annual Average Growth Rates						
1990-2000	1.45%	1.46%		1.31%	1.31%	
2000-2005	0.82%	0.49%		1.62%	1.78%	
2005-2008	1.29%	2.12%		1.40%	2.41%	
2008-2016	1.11%	1.21%		1.24%	1.24%	
Historic values are shaded; changes in historic data reflect corrections made by staff and utilities.						
GWH=gigawatt-hour. MW = megawatt						

Higher residential consumption results from higher air conditioning saturations, and revised floor space estimation techniques lead to increased floor space projections, which, accordingly, raise the forecast for commercial consumption. Figure ES-1 clearly shows the effect of these changes from the previous forecast.

**Figure ES-1: Statewide Electricity Consumption**



On the peak demand side, the forecast is about 2 percent higher than in the 2005 forecast, consistent with the increases made in recent updates in the short-term peak demand forecast. The higher recorded peaks most likely represent the effect of higher saturations of residential air conditioning than was previously assumed. Peak demand grows an average of 1.2 percent annually. The primary reason for the higher growth rate of the peak demand forecast compared to the electricity consumption forecast is the reduced impact of the 2005 federal air conditioning standards on peak. While the 2005 standard's change to seasonal energy efficiency ratio 13 is accounted for in the energy consumption projection, some analyses find uncertainty as to whether the move to a higher seasonal energy efficiency ratio actually reduces peak demand; therefore, the 2005 standards are not included in the peak demand forecast.

This effect is offset slightly by a higher forecast of load served by self-generation; this forecast includes a forecast of impacts from the California Solar Initiative program, which was not established at the time of the 2005 forecast. Figure ES-2 graphically represents the peak forecast.

**Figure ES-2: Statewide Non-Coincident Peak Demand**

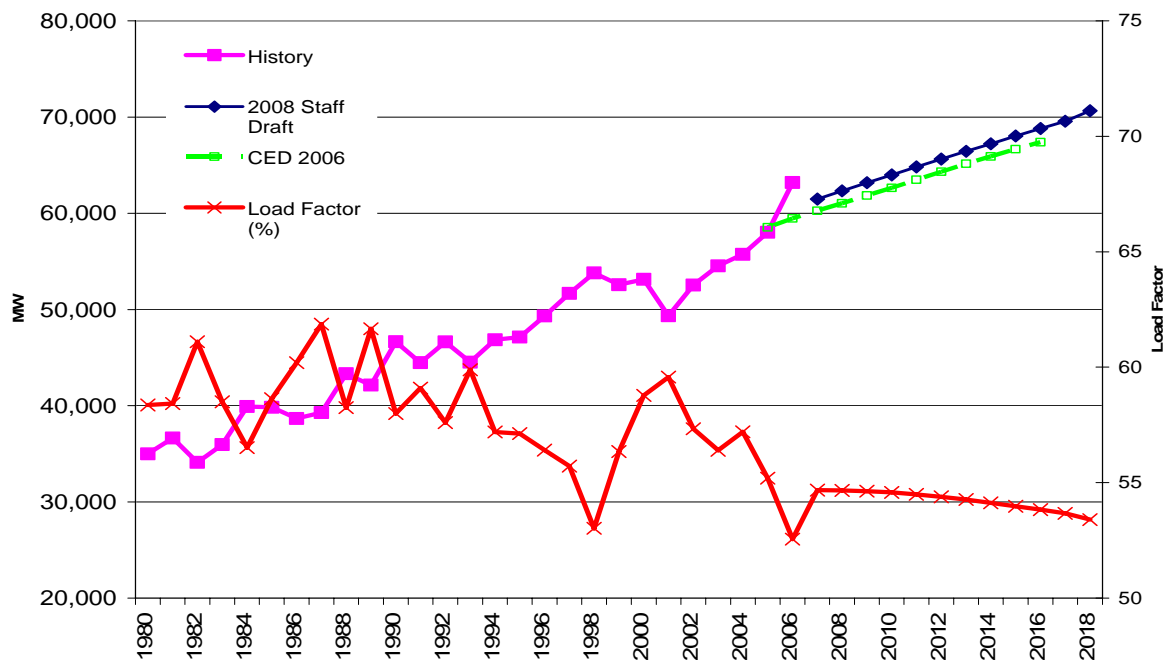


Figure ES-2 also shows the load factor for the state as a whole. The load factor represents the relationship between average energy demand and peak; a high load factor means the peak is not much higher than average hourly demand. The load factor varies with temperature; in extremely hot years (1998, 2006) demand shows a sharper increase in peak. The general decline in the load factor over the last 20 years represents a greater proportion of homes in warmer areas and more homes and businesses with central air conditioning.

### ***Natural Gas***

The draft natural gas forecast has a higher growth rate than does the 2005 forecast. Most of this increase is in the commercial sector because of higher floor space projections. This forecast does not include natural gas used for electric generation.

### ***Historic Data***

The historic data used for this forecast differs from the 2005 forecast because of revised data submitted by utilities and because a detailed review of self-generation consumption data found some data had been misclassified. Problems caused by an industry-wide conversion of energy consumption data reporting from the SIC system to NAICS, and also by a lack of reporting regulation adherence by the LSEs in general, has led to improper classification of energy consumption. Unclassified consumption is now the fastest growing category of



consumption reported to the Energy Commission. Staff allocated unclassified and misclassified data to economic sectors using professional judgment.

### ***Overview of Methods and Assumptions***

The staff draft forecast is the product of essentially the same methods used to prepare earlier long-term staff demand forecasts. The commercial, residential, and industrial sector energy models are structural models that attempt to explain how energy is used by process and end use. The forecasts of agricultural and water pumping energy demand are made using econometric methods. After adjusting for historic weather and usage, the annual consumption forecast is used to forecast annual peak demand.

### **Economic and Demographic Assumptions**

Population growth is a key driver for residential energy demand, as well as for commercial growth and demand for water pumping and other services. Population is projected to grow at about 1.2 percent annually. By comparison, statewide population grew an average of 1.3 percent annually from 1990 to 2000. The declining growth rates over the forecast horizon reflect lower rates of fertility and immigration as the population of California and other regions ages. Older age cohorts have a lower propensity to immigrate.

Personal income is projected to grow at 2.7 percent annually, compared to 2.5 percent in the 2005 forecast.

### **Electricity Rate Projections**

The 2005 forecast used rate projections developed by Energy Commission staff, which in general declined over time. For this draft forecast, the sector energy demand was forecasted with future real electricity rates held constant at their current levels. This change to higher forecasted rates primarily affects commercial and industrial sector demand.

# CHAPTER 1: INTRODUCTION AND STATEWIDE FORECAST

## Introduction

This California Energy Commission (Energy Commission) staff report presents forecasts of electricity and end-user natural gas consumption and peak electricity demand for the State of California and for each major utility planning area within the state for 2008-2018. The staff *California Energy Demand 2008-2018* (CED 2008) forecast supports the analysis and recommendations of the 2007 *Integrated Energy Policy Report (IEPR)*, including electricity and natural gas system assessments and analysis of progress toward energy efficiency, demand response, and renewable energy goals.

The IEPR Committee will conduct a workshop on July 10, 2007, to receive public comments on this forecast. Following the workshop, subject to the direction of the Committee, staff may prepare a revised forecast or range of forecasts for adoption by the Energy Commission.

The final forecasts will be used in a number of applications, including the California Public Utilities Commission (CPUC) 2008 procurement process. The CPUC has identified the IEPR process as “the appropriate venue for considering issues of load forecasting, resource assessment, and scenario analyses to determine the appropriate level and ranges of resource needs for load serving entities (LSEs) in California.”<sup>1</sup> The final forecasts will also be an input to California Independent System Operator (California ISO) controlled grid studies and other transmission planning studies. The *California Gas Report* also uses Energy Commission demand and supply assessments. The final forecasts will be used in the Energy Commission’s electricity supply-demand assessments.

## ***Summary of Changes to Forecast***

The previous long-run forecast, *California Energy Demand 2006-2016*<sup>2</sup> (CED 2006) was based on 2005 peak demand and 2004 energy. For the current forecast, staff added 2005 energy consumption data to the historic series used for forecasting. The peak demand forecast incorporates recent analysis of 2006 temperatures and peak demand at the planning area level, which was published in *Staff Forecast of 2008 Peak Demand*.<sup>3</sup> Sector level loads for 2006 are not yet available by utility planning area.

In the residential sector, appliance saturations have been updated based on more current survey data. This had the effect of increasing air conditioning demand, but lowering some other energy uses. In the commercial sector, staff revised its estimates of existing floor space and projected new floor space using updated economic projections and a new econometric methodology. Both changes increase

projected commercial consumption. The energy and peak demand forecasts now include a projection of the impacts of the California Solar Initiative (CSI).

## **Statewide Forecast Results**

Table 1-1 presents a comparison of the staff draft CED 2008 forecast for select years with the CED 2006 final forecast used in the *2005 IEPR*. Both the CED 2008 energy consumption and peak forecasts are slightly higher than the CED 2006 forecast over the entire forecast period, primarily because both weather-adjusted peak and electricity consumption were slightly higher than forecasted in CED 2006. The draft forecast has a higher growth rate (1.2 percent versus 1.1 percent in CED 2006) because of higher projected demand in the residential and commercial sectors.

On the peak demand side, the forecast is about 2 percent higher than CED 2006, consistent with the increases made in recent updates in the short-term peak demand forecast. The higher recorded peaks most likely represent the effect of higher saturations of air conditioning than was assumed in the CED 2006 forecast. Peak demand grows an average of 1.2 percent annually. The primary reason for the higher growth rate of the peak demand forecast compared to the electricity consumption forecast is the reduced impact of the 2005 federal air conditioning standards on peak. While energy consumption projection accounts for the 2005 standard's change to seasonal energy efficiency ratio (SEER) 13, some analyses find uncertainty as to whether the move to a higher SEER actually reduces peak demand; therefore the 2005 standards are not included in the peak demand forecast.<sup>4</sup> The SEER performance metric is based on indoor conditions that require more dehumidification than is representative of the hot, dry climate that characterizes much of California. It also assumes outdoor temperatures far below the average annual maximum temperatures experienced in California.

This effect is offset slightly by a higher forecast of load served by self-generation; this forecast includes a forecast of impacts from the CSI program which was not established at the time of the CED 2006 forecast. The peak demand forecast represents the net amount of load that must be served by the electric grid so demand by self-generation is excluded, whereas consumption includes all demand regardless of how it is met.

The historic data used for this forecast differs from CED 2006 because of revised data submitted by utilities and because a detailed review of self-generation consumption data found some data had been misclassified.

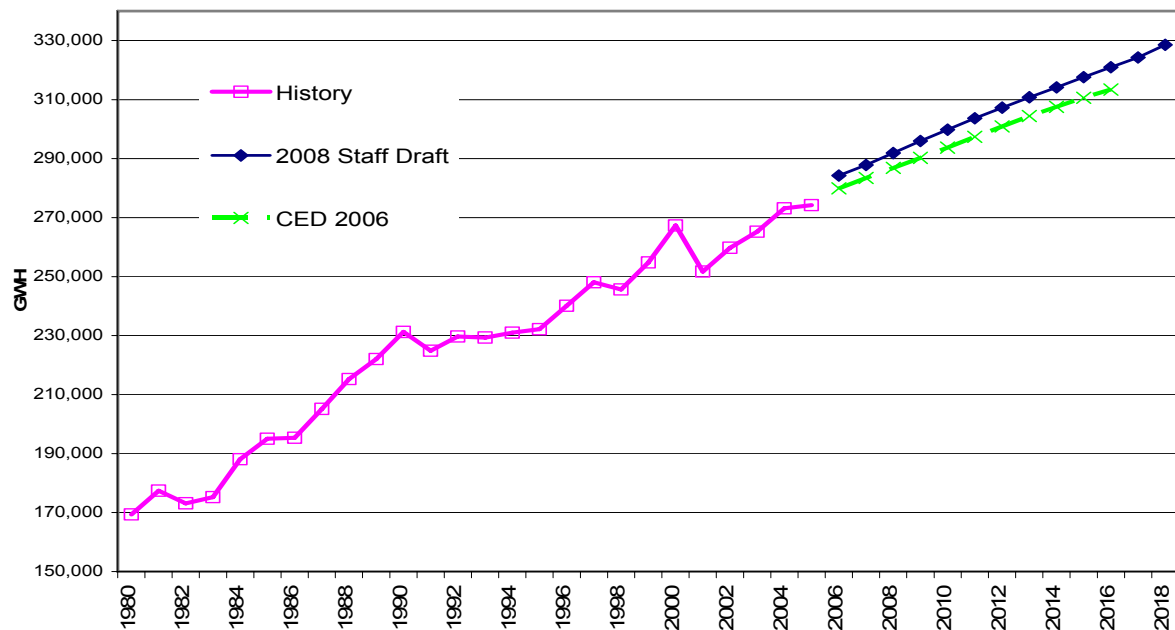
**Table 1-1: Comparison of CED 2006 and Staff Draft Forecasts  
of Statewide Electricity Demand**

	Consumption (GWH)			Peak (MW)		
	CED 2006	Staff Draft	Percent Difference Staff Draft/CED 2006	CED 2006	Staff Draft	Percent Difference Staff Draft/CED 2006
1990	229,375	228,473	-0.39%	47,431	46,646	-1.65%
2000	265,021	264,229	-0.30%	54,028	53,127	-1.67%
2005	276,012	270,742	-1.91%	58,546	58,023	-0.89%
2008	286,813	288,370	0.54%	61,042	62,327	2.11%
2013	304,400	307,308	0.96%	65,144	66,449	2.00%
2016	313,397	317,477	1.30%	67,379	68,804	2.12%
Annual Average Growth Rates						
1990-2000	1.45%	1.46%		1.31%	1.31%	
2000-2005	0.82%	0.49%		1.62%	1.78%	
2005-2008	1.29%	2.12%		1.40%	2.41%	
2008-2016	1.11%	1.21%		1.24%	1.24%	
Historic values are shaded; changes in historic data reflect corrections made by staff and utilities.						
GWH=gigawatt-hour						
MW = megawatt						

## Annual Electricity Consumption

The staff draft statewide electricity consumption forecast, shown in Figure 1-1, is higher than the CED 2006 forecast over the entire forecast period, although the projected annual growth rate is only slightly higher. The overall increase in the forecast reflects several factors. Temperatures in 2005 were below average so the 2006 starting point is adjusted up. Also, the increased level of both projected commercial floor space and personal income increases demand projections.

**Figure 1-1: Statewide Electricity Consumption**

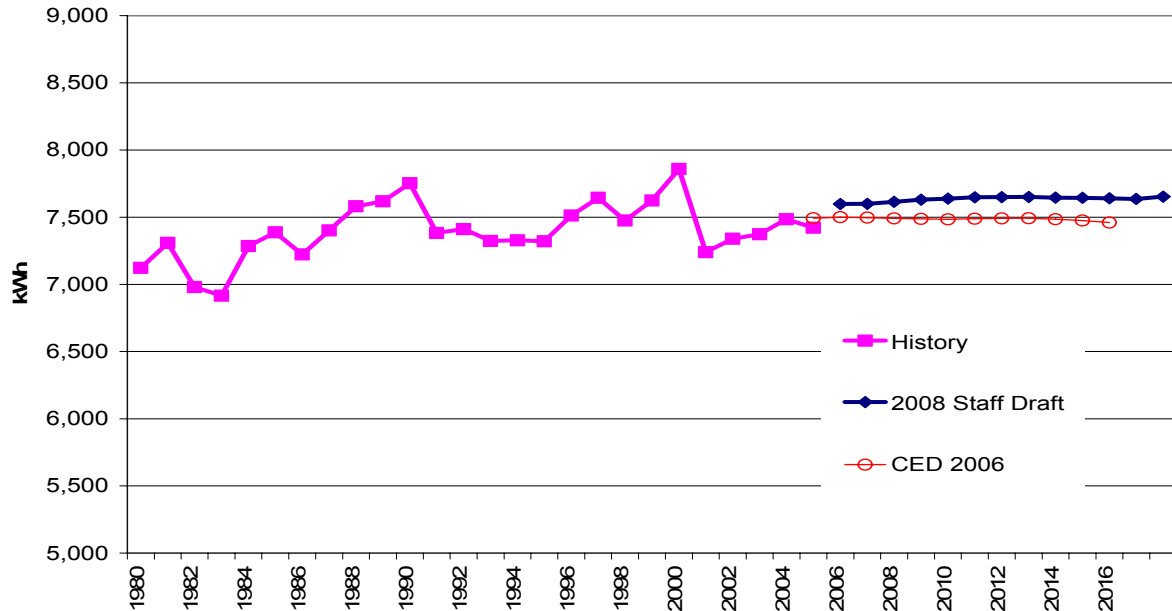


Per capita electricity consumption, shown in Figure 1-2, is projected to remain relatively constant over the forecast period at just below 7,500 kilowatt hours (kWh) per person. This is about 150 kWh higher than the final CED 2006 forecast. Per capita consumption has been relatively constant over the past 15 years, fluctuating between 7,200 and 7,800 kWh per person, depending on economic and annual temperature conditions.

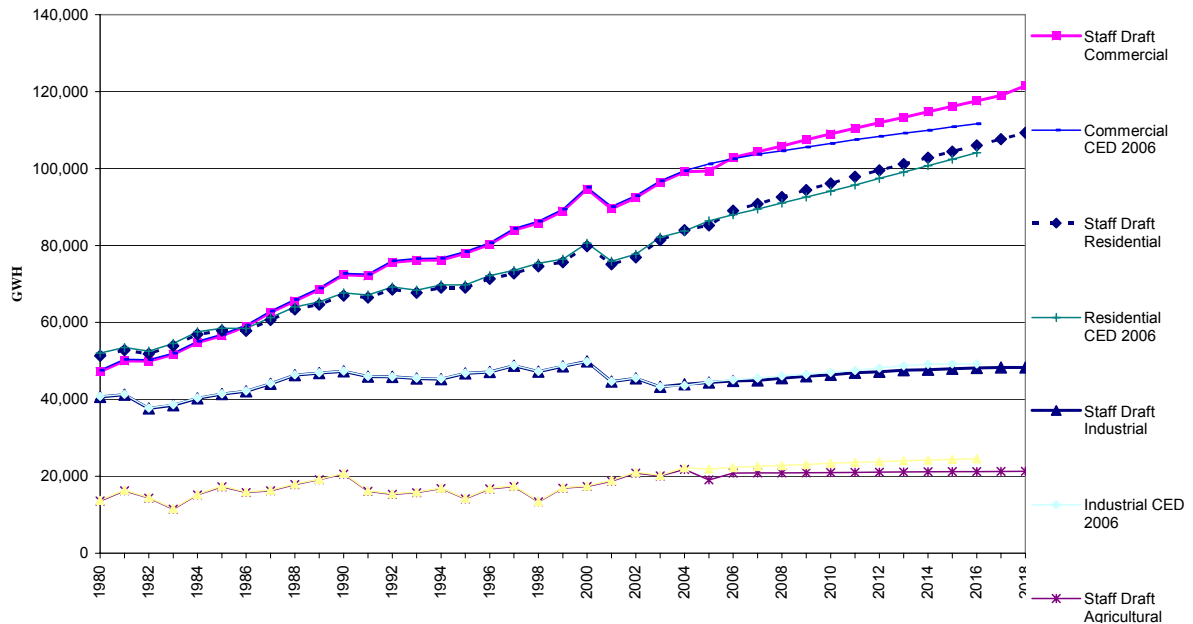
Figure 1-3 shows the current and previous forecasts of electricity consumption by the major economic sectors. Over the historic period, the commercial sector has had the highest growth followed by the residential sector. In the forecast period, the residential sector continues to grow at the historic rate (1.7 percent), while the commercial sector slows slightly to 1.4 percent annual growth. The draft commercial sector forecast growth is higher than in CED 2006 because of staff's revised forecast of commercial floor space, discussed in the methodology section of this chapter. The industrial forecast growth rate is lower because of slightly lower economic projections and because electricity rates are held constant in this forecast, while previously rates were projected to decline. The agricultural and water pumping

forecast is also reduced by the higher rates and because of apparent decreasing energy intensity in the agriculture sector.

**Figure 1-2: Statewide Electricity Consumption per Capita**



**Figure 1-3: Statewide Electricity Consumption by Sector**



To support sub-regional electricity system analysis, staff disaggregates its planning area forecasts to correspond to control areas and congestion zones. Table 1-2

shows the forecast of energy required to meet demand by control area and congestion zone. Demand is expected to grow the fastest in the SMUD control area, reflecting strong population growth in Sacramento, Roseville, and Redding. In the California ISO, demand is projected to about 1 percent annually.

**Table 1-2: Net Energy for Load by Control Area (GWH)**

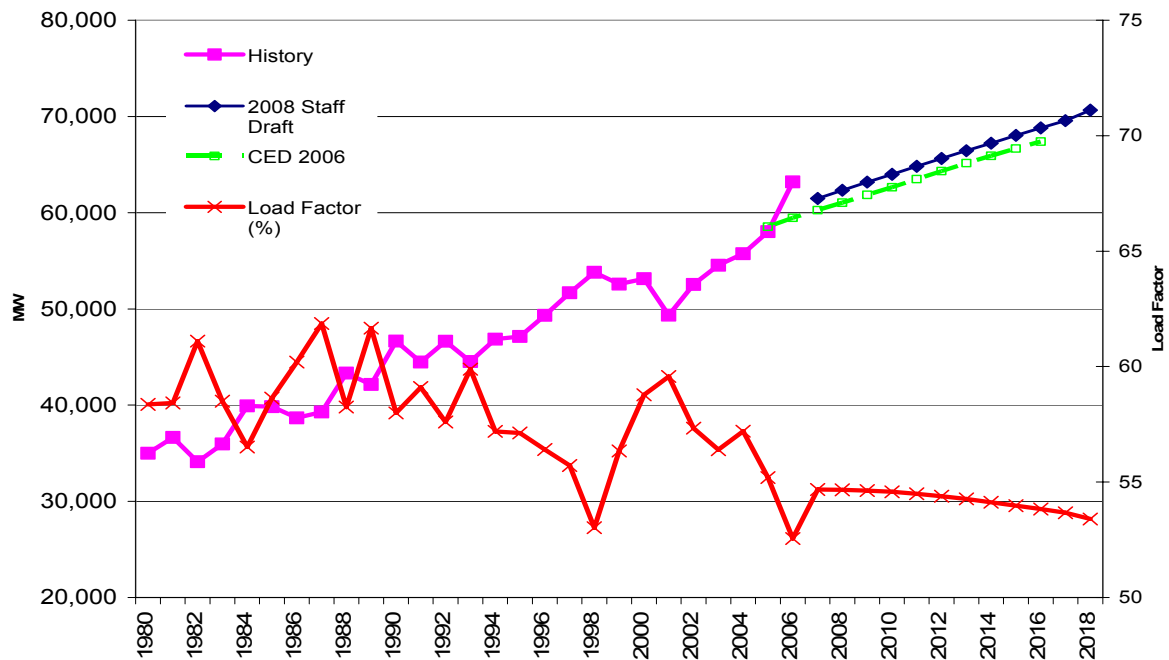
	<b>North of Path 15</b>	<b>South of Path 15</b>	<b>CAISO Total</b>	<b>Turlock Irrigati on District</b>	<b>SMUD/ WAPA</b>	<b>LADWP</b>	<b>Imperial Irrigation District</b>
2000	106,396	126,102	225,326	1,584	19,216	27,481	3,040
2007	114,527	133,403	239,416	2,892	21,968	30,318	3,689
2008	115,994	135,285	242,677	2,935	22,368	30,545	3,762
2018	128,303	149,618	268,577	3,296	26,541	31,882	4,479
<b>Annual Growth Rates</b>							
2000-2005	1.48%	1.13%	1.22%	12.79%	2.71%	1.98%	3.94%
2005-2008	0.43%	0.47%	0.45%	0.49%	0.60%	0.25%	0.66%
2008-2018	1.01%	1.01%	1.02%	1.17%	1.73%	0.43%	1.76%

### ***Statewide Peak Demand***

Figure 1-4 compares the draft forecast of statewide non-coincident peak demand with the CED 2006 forecast. Because weather-adjusted peak in 2006 proved higher than forecast and the saturation of air conditioners increased, the new forecast begins at a higher level, but the growth rates are very similar. Figure 1-4 also shows the load factor for the state as a whole. The load factor represents the relationship between average energy demand and peak; a high load factor means the peak is not much higher than average hourly demand. The load factor varies with temperature; in extremely hot years (1998, 2006) demand is “peakier.” The general decline in the load factor over the last 20 years represents a greater proportion of homes in warmer areas and more homes and business with central air conditioning. These trends are projected to continue over the forecast period. Energy efficiency measures, such as more efficient lighting, can also contribute to the declining load factor by reducing energy use while having an insignificant effect on peak.

The forecast of per capita non-coincident peak, shown in Figure 1-5, is projected to increase slightly over the forecast period to 1.64 kilowatts per person in 2018

**Figure 1-4: Statewide Non-Coincident Peak Demand**



**Figure 1-5: Statewide Non-Coincident Peak Demand per Capita**

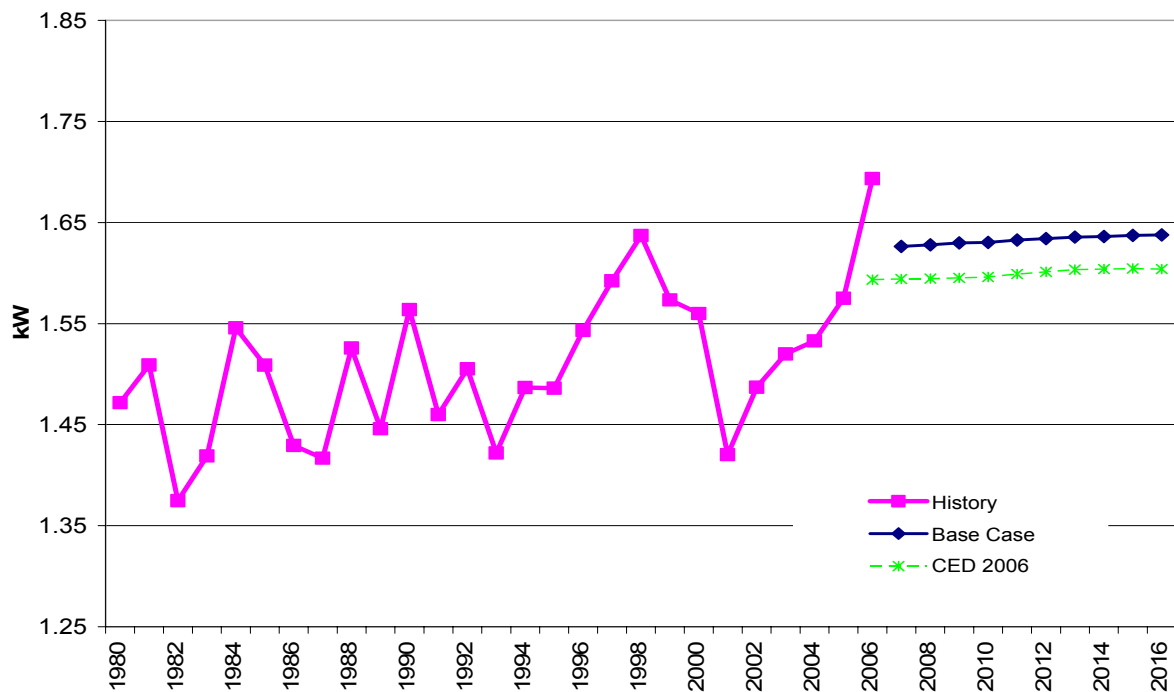


Figure 1-6 shows peak demand by the major economic sectors. As in the consumption forecast, residential demand grows fastest at 1.8 percent annually.



Commercial sector peak demand, dampened by lighting standards, grows at less than 1.3 percent compared to 0.9 percent in CED 2006. Industrial peak demand grows at 0.6 percent annually, about the same as industrial energy growth.

**Figure 1-6: Statewide Peak Demand by Sector (MW)**

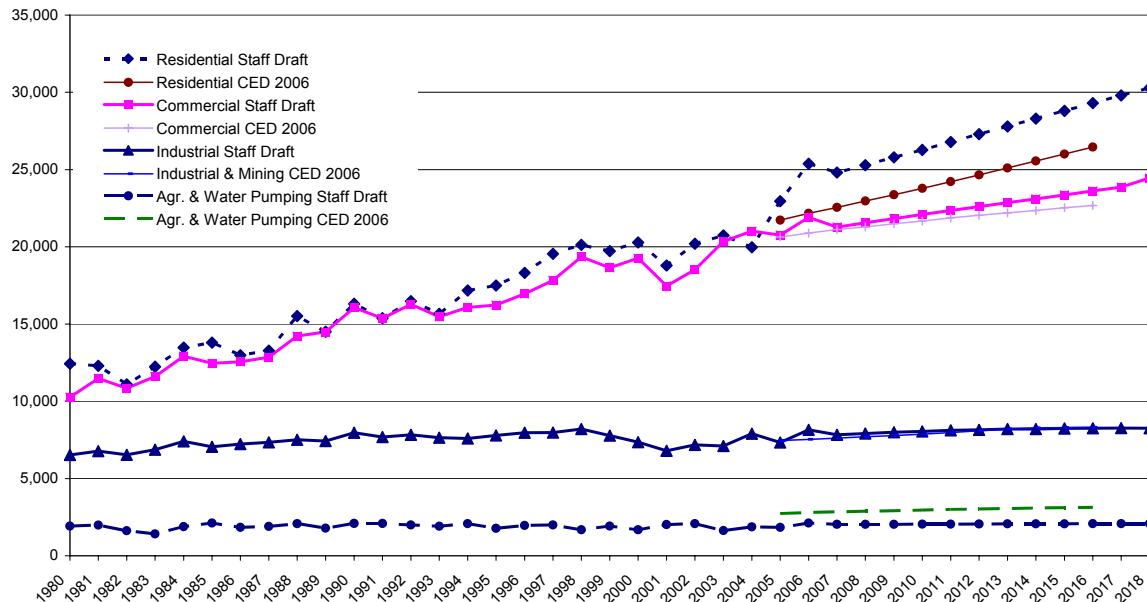


Table 1-3 shows peak demand by control area. As in the energy forecast, the SMUD area grows the fastest, with demand increasing by over 1,000 MW by 2018. The South of Path 15 zone of the California ISO is forecasted to add over 3,000 MW of load by the end of the forecast.

**Table 1-3: Peak Demand (MW) by Control Area**

	Total North of Path 15	South of Path 15	CAISO Total	Turlock Irrigation District	SMUD/WA PA	LADWP	Imperial Irrigation District
2000	20,862	23,473	42,962	322	3,765	5,859	753
2005	21,441	26,756	46,789	396	4,239	6,305	874
2008	23,269	28,515	50,213	582	4,726	6,480	935
2018	26,465	32,262	56,961	663	5,799	6,743	1,109
<b>Annual Growth Rates</b>							
2000-2005	0.55%	2.65%	1.72%	4.22%	2.40%	1.48%	3.03%
2005-2008	2.76%	2.15%	2.38%	13.68%	3.69%	0.92%	2.26%
2008-2018	1.30%	1.24%	1.27%	1.31%	2.07%	0.40%	1.73%

## Natural Gas Demand Forecast

Table 1-4 compares the staff draft forecast with the CED 2006 forecast of end-user natural gas consumption. This forecast does not include natural gas used for electric generation. The draft CED 2008 forecast has a higher growth rate. Most of this increase is in the commercial sector, because of the higher estimates of floor space and higher floor space projections. Higher saturations of gas appliances in the residential sector also increase the forecast.

**Table 1-4: Statewide End-User Natural Gas Consumption**

Consumption (MM Therms)			
	CED 2006	Staff Draft	Percent Difference
1990	12,893	12,893	0.00%
2000	13,915	13,915	0.00%
2005	13,550	13,041	-3.76%
2008	13,528	13,970	3.27%
2016	13,850	14,625	5.60%
Annual Average Growth Rates			
1990-2000	0.77%	0.77%	
2000-2005	-0.53%	-1.29%	
2005-2008	-0.05%	2.32%	
2008-2016	0.27%	1.44%	
Historic values are shaded			

## Methods and Assumptions

The CED 2008 forecast is the product of essentially the same methods used to prepare earlier long-term staff demand forecasts. The specific data sources and assumptions used for this forecast and any changes to methodology since CED 2006 are described here. A more detailed discussion of forecast methods and data sources is available in the *Methodology Report*.<sup>5</sup>

Models for the major economic sectors produce forecasts of annual energy consumption in each utility planning area. After adjusting for historic weather and usage, the annual consumption forecast is used to forecast annual peak demand.

The commercial, residential, and industrial sector energy models are structural models that attempt to explain how energy is used by process and end use. Structural models are critical to enable forecasts to account for the impacts of mandatory energy efficiency standards and other energy efficiency programs that seek to force or encourage adoption of more efficient technologies by end users. This is especially true in the context of the major emphasis upon energy efficiency in California. The forecasts of agricultural and water pumping energy demand are made using econometric methods.

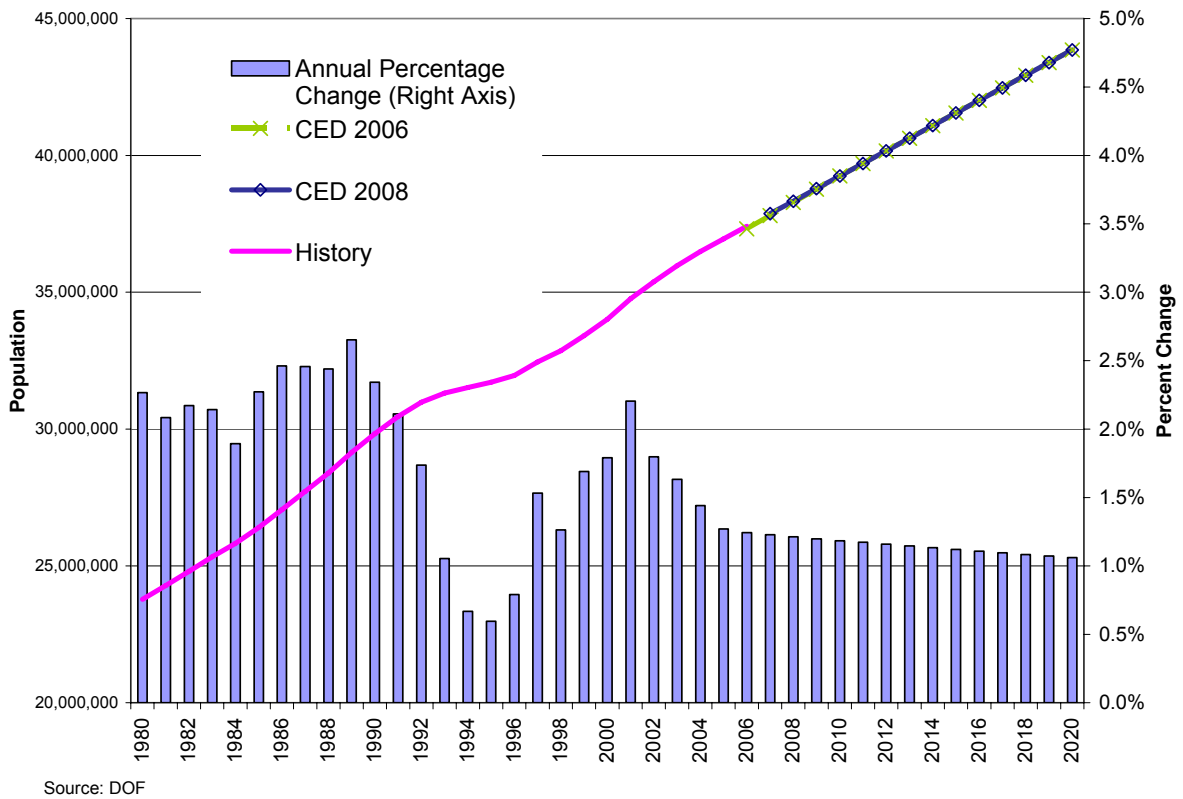
### **Economic and Demographic Assumptions**

Population growth is a key driver for residential energy demand, as well as for commercial growth and demand for water pumping and other services. The California Department of Finance's most recent long-term population forecast was published in May 2004,<sup>6</sup> the same forecast used in the CED 2006 forecast. The estimates of population for 2004 and 2005 have been updated.<sup>17</sup>

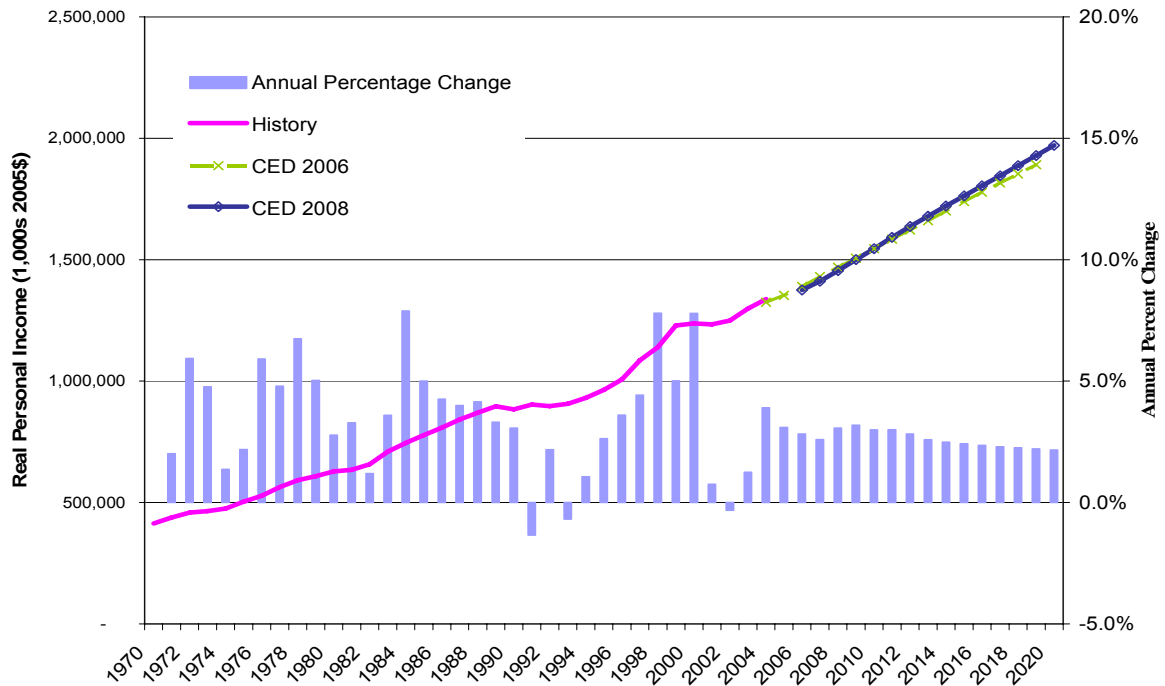
Figure 1-7 compares these two population projections. Population is projected to grow at about 1.2 percent annually. By comparison, statewide population grew an average of 1.3 percent annually from 1990 to 2000. The declining growth rates over the forecast horizon reflect lower rates of fertility and immigration as the population of California and other regions age. Older age cohorts have a lower propensity to immigrate.

Figure 1-8 presents a comparison of statewide per capita income. In its May 2007 projections used for this forecast, Economy.com projects a slightly higher rate of growth than in the projections used for CED 2006. Personal income is projected to grow at 2.7 percent annually, compared to 2.5 percent in CED 2006.

**Figure 1-7: Total Statewide Population**



**Figure 1-8: Statewide Personal Income (\$2005)**



## **Electricity Prices**

Energy Commission staff presented a draft forecast of the average rate paid by consumers at a July 2, 2007, workshop. For this draft forecast, the sector energy demand was forecasted with future real electricity rates held constant at their current levels. Staff used data provided by each of the major utilities on historic revenues and sales to estimate historic and current revenue per kilowatt hour for each economic sector or rate class. The CED 2006 forecast used rate projections developed by Energy Commission staff, which in general declined over time. This change to higher forecasted rates primarily affects commercial and industrial sector demand.

## **Residential End-Use Assumptions**

Since the CED 2006 forecast, staff updated the appliance saturation estimates for all 24 end uses that comprise the residential sector to incorporate the findings of the 2004 Residential Appliance Saturation Survey (RASS). Saturation refers to the percentage of homes that have a given end use.

The most dramatic effect of these saturation revisions concerns air conditioning, and most specifically, central air conditioning. With the restructuring of the California electricity industry, end-user surveys and other data collection activities were not funded for many years, and the Energy Commission experienced a 10-year hiatus in residential appliance saturation survey activity.

This lack of information means that staff missed a major period of retrofitting; many homes that formerly had either a room air conditioner or no air conditioning at all have since had a central system installed. For example, in recent previous forecasts of the SMUD service territory, staff estimated that approximately 70 percent of single family homes had a central AC system. Based on the new RASS, staff now estimates that close to 95 percent of single family homes in the SMUD service territory, and many other parts of the Central Valley, have central air conditioning. Staff's corrected estimates drive an increase in forecasted peak load, due to the near complete saturation of air conditioning in warmer climates.

More temperate climates are becoming increasingly dependent upon air conditioning too. Staff estimates that PG&E's climate zone 4, which surrounds San Francisco and includes Santa Rosa and San Jose, has a central air conditioning saturation of nearly 50 percent, which is double previous saturation estimates. More than 75 percent of new single family homes in climate zone 4 are projected to have central air conditioning.

This increase in electricity consumption from higher air conditioning activity is balanced somewhat by the effect of revised saturation estimates for natural gas appliances. The trend toward use of natural gas instead of electricity for cooking, water heating, and space heating leads to increased forecasted gas consumption for these appliances in every utility service area compared to previous forecasts.

## Commercial Sector Assumptions

Energy use in the commercial sector is modeled in terms of energy use per square foot for each of 12 different building types. A forecast of floor space in each county serves as the economic driver of demand trends. For this forecast, staff made significant changes to the methods and data used for forecasting floor space and vacancy rates.

The historic floor space stock estimates were revised based on analysis of the McGraw Hill database of permits for new buildings and floor space additions from 1970 through 2005, by county. Staff creates a time series of floor space stock (rather than additions) by allowing additions to decay as they age, in concert with the logistic survival formula:

$$Survival(\text{age } t) = \frac{e^v}{1 + e^v} \quad \text{where } v = 6.912 \left( 1 - \frac{t}{\text{median life}} \right).$$

Logistic survival posits that few buildings are torn down in their early years and that tear-downs accelerate as buildings approach their average lifetime, then slow down again as fewer old buildings remain.

For CED 2006, the projection of future floor space additions was based on historic average growth in floor space. For CED 2008, staff developed an econometric method for forecasting growth in floor space. For each building type, staff identified the economic or demographic variable that best correlates with energy use over time. Those variables are shown in Table 1-5.

**Table 1-5: Economic/Demographic Variables Specified for Each Building Type**

Building Type	Variables
Small Office	Employment in finance, information, and government sectors; personal income; population
Large Office	Employment in finance, information, and government; personal income; population
Restaurant	Employment in services; per capita income; population
Retail	Employment in retail; personal income; population
Grocery	Employment in retail; personal income; population
Warehouse	Employment in food manufacturing; employment in wholesale; population
Refrigerated Warehouse	Employment in food manufacturing; employment in wholesale; population
School	Population aged 5-17; personal income; population
College	Population aged 18-24; personal income; population
Hospital	Employment in health/education; population aged 65 and higher; population
Hotel	Employment in leisure activities; per capita income; population
Miscellaneous	Per capita income; personal income; population

To develop a relationship between floor space and the economic/demographic variables, changes in floor space from year to year for each building type and

climate zone for the period 1980-2005 were regressed on three relevant economic/demographic variables, current and lagged, as follows:

$$\Delta FS = a + b_1\Delta D_1 + b_2\Delta D_{1-1} + b_3\Delta D_{1-2} + b_4\Delta D_{1-3} \\ b_5\Delta D_2 + b_6\Delta D_{2-1} + b_7\Delta D_{2-2} + b_8\Delta D_{2-3} \\ b_9\Delta D_3 + b_{10}\Delta D_{3-1} + b_{11}\Delta D_{3-2} + b_{12}\Delta D_{3-3} + \epsilon$$

where  $\Delta FS$  is change in floor space from year  $t-1$  to year  $t$  and  $\Delta D$  is the current or lagged annual change in an economic/demographic variable. Changes were used rather than levels to avoid autocorrelation problems. Lagged variables were included to take into account time delay between a change in the state's economy and demographics and a response in terms of new construction.

Individual variables  $\Delta D$  were eliminated from the estimation if they did not reduce the regression's standard error. As an example, the change in hotel floor space in each climate zone was specified as a function of changes in projected leisure jobs, income per capita, and population (and their lags). After eliminating insignificant variables, the final regression for climate zone 2 included current per-capita income and population, per-capita income lagged two periods, and population lagged three periods; for climate zone 3, the final regression included only current per-capita income and population.

Using the regression results, floor space for each building type and climate zone was forecasted using economic and demographic projections from Economy.com and the California Department of Finance. Annual floor space additions were calculated by subtracting estimated building decay from year-to-year changes in projected floor space.

Vacancy rates for both historical and forecast years were estimated using data on office building vacancies by county for 1984-2005. Vacancy rates were specified as a function of the rate of net building additions and growth in employment in office related jobs (government, information, and finance). Regression yielded the following:

$$\text{Vacancy rate}(t) = 14.66 + 42.27 \times \text{additions rate}(t) - 34.73 \times \text{employment growth}(t)$$

with both explanatory variables statistically significant at a 95 percent confidence level. This estimated relationship was used to project vacancy rates for all building types, with employment growth in office-related employment replaced by a growth indicator relevant to the particular building type. For example, growth in projected retail employment was used in the case of retail buildings, and growth in school age population was used for schools.

### **Programmatic Assumptions**

Energy Commission demand forecasts seek to account for all conservation that is "reasonably expected to occur." Since the 1985 *Electricity Report*, reasonably expected to occur conservation programs have been split into two types: committed

and uncommitted. This demand forecast continues that distinction. Committed programs are defined as programs that have been implemented or for which funding has been approved. While conservation reasonably expected to occur includes both committed and uncommitted programs, only the effects of committed programs are included in the demand forecast. However, the Energy Commission models include naturally occurring or market-driven energy efficiency. Therefore the forecasts may include some impacts associated with the historic and ongoing levels of programs to the extent they represent impacts associated with replacement of aging building stock and equipment or installation of new stock and equipment at efficiency levels that comply with current building and appliance standards. Uncommitted effects are thus defined as the incremental impacts of the level of future programs (for example, savings associated with new equipment that exceeds current standards or early replacement of existing stock), impacts of new programs, and impacts from expansion of current programs.

#### ***Investor-Owned Utility Energy Efficiency Goals***

For the IOUs, committed conservation programs are those programs included in the 2006-2008 program plans approved in the CPUC Energy Efficiency Rulemaking Proceeding (R04-06-010) or in other CPUC decisions. In decision D.04-09-060, the CPUC established numerical goals for electricity and natural gas savings for the IOUs for the period 2004-2013.<sup>8</sup> D.04-09-060 implements a core component of the *Energy Action Plan* (EAP), which was earlier adopted by the CPUC, the California Energy Commission, and the California Consumer Power and Conservation Financing Authority. The decision translated that mandate into explicit, numerical goals for reducing electricity and natural gas consumption as well as peak demand. Savings from energy efficiency programs funded by the public goods charge and procurement rates will contribute to these goals, including those achieved through the Low-Income Efficiency Program.

Because the post-2008 goals are currently under review at the CPUC, only impacts of the energy efficiency goals through 2008 are accounted for in this forecast. The electricity program savings goals used for each IOU are shown in Table 1-6. To account for these goals in the forecast, staff assumed each IOU's current mix of programs continued, adjusting the funding level to achieve the goals. The resulting forecast of efficiency impacts was then used to adjust the raw residential and commercial demand forecasts.



**Table 1-6**

<b>First Year Impacts of 2004-2008 Energy Efficiency Goals</b>						
	<b>PG&amp;E</b>		<b>SCE</b>		<b>SDG&amp;E</b>	
	Gwh	MW	Gwh	MW	Gwh	MW
2004	744	161	826	179	268	58
2005	744	161	826	179	268	58
2006	829	180	922	200	281	61
2007	944	205	1046	227	285	62
2008	1053	229	1167	253	284	62

***Demand Response***

The term “demand response” encompasses a variety of programs, including traditional direct control (interruptible) programs and new price-responsive demand programs. A key distinction is whether the program is dispatchable. Dispatchable programs, such as direct control, interruptible tariffs, or demand bidding programs, have triggering conditions that are not under the control of and cannot be anticipated by the customer. Energy or peak load saved from dispatchable programs is treated as a resource and therefore not accounted for in the demand forecast. Nondispatchable programs are not activated using a predetermined threshold condition, but allow the customer to make the economic choice whether to modify its usage in response to ongoing price signals. Impacts from committed nondispatchable programs should be included in the demand forecast.

At this time, all of the existing demand response programs have some form of triggering condition. Although the utility or California ISO may not have direct control, the customer only has the opportunity to participate in the program when the program operator has called an event, either because of high market prices or resource scarcity. Therefore, in this forecast, no demand response impacts are counted on the demand side.

***Self-Generation***

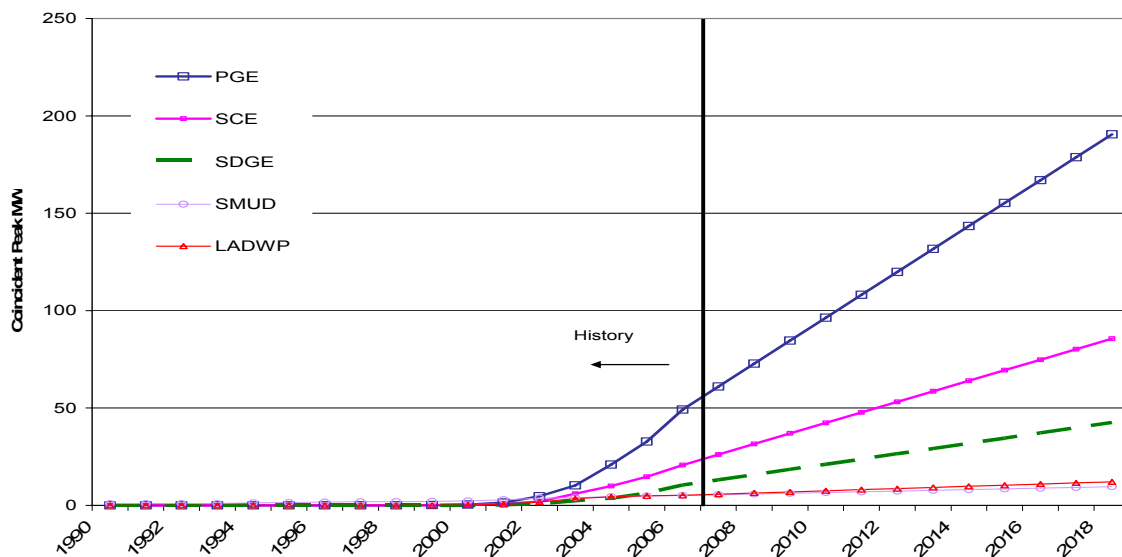
This forecast accounts for effects of two program areas designed to promote self-generation: the California Self-Generation Incentive Program (SGIP), and the CSI programs, including the CPUC-administered CSI, along with the the Energy Commission New Solar Home Partnership and the Emerging Renewable Program (ERP) that has been administered by the California Energy Commission.

***California Solar Initiative***

The general strategy of the ERP and CSI programs is to encourage demand for solar photovoltaic (PV) arrays with financial incentives until the size of the market increases to the point where economies of scale are achieved and capital costs decline. As PV production capacity comes on line in the next few years production and hence the price of PV installations are expected to decline. However, the extent

to which consumers see real price declines will depend on the interplay of supplier expectations, the future level of incentives, and demand as manifested by the number of states or countries offering subsidies for PV. For example, when the ERP was established, the expectation was that the subsidy would only be necessary for a few years. Then Germany offered an incentive, driving up demand in excess of the production increase. Many states and countries have no solar programs, therefore the possibility of similar future effects seems very possible. Given the uncertainty of the timing and magnitude of future PV price changes, staff assumed that the recent rate of installations would continue through the forecast period. This projection may prove to be conservative, but is consistent both with current demand and the current stock of businesses in California selling and installing PV services. Technical assumptions about PV system performance were derived from the recent Energy Commission report, *Scenario Analysis of California's Electricity System (Scenario Report)*.<sup>9</sup> Figure 1-9 shows the resulting forecast for the major utility areas. These projections represent the available capacity at the time of the system peak, which is estimated to be about 46 percent of the installed capacity.

**Figure 1-9: Peak Impacts of the CSI Program by Utility**



Assembly Bill 970 required the CPUC to initiate load control and distributed generation program activities designed to produce significant public benefits. On March 27, 2001, the CPUC issued Decision 01-03-073 mandating a self-generation program in the service territories of California's investor-owned utilities (IOUs). The SGIP offers financial incentives to customers of IOUs who install certain types of distributed generation facilities to meet all or a portion of their energy needs. The program began in mid-2001 and is scheduled to continue offering incentives for completed projects through the end of 2011.

To forecast future self-generation load, staff used the IOU reports on completed new interconnections and pending applications to develop projections of capacity additions of new interconnections.<sup>10</sup> The interconnection reports provide a detailed

picture of capacity addition trends. To translate self-generation capacity into effects on system peak demand requires assumptions about load shape, the coincidence of self-generation peak with system peak, and the extent to which self-generation units are operating during peak hours. Staff used the evaluation studies of the SGIP program for these assumptions.<sup>11</sup> For example, the 2004 study found that the load impact at the time of the 2004 California ISO peak was 58 MW out of 103 MW of installed capacity. As in the previous forecast, it is assumed that new additions will continue at the current rate through the life of the SGIP program. After 2011, self-generated loads are assumed to grow at the rate of the utilities' noncommercial sector. The revised forecast is slightly higher than in CED 2006 with a peak impact of 2,200 MW by 2018.

Table 1-7 shows the combined impact of the SGIP and CSI forecasts. Together, they may reduce the load which must be served by 2,800 MW by 2016. The large increase relative to CED 2006 represents the impact of the CSI program.

**Table 1-7: Self-Generation and CSI Demand Forecast**

	Consumption (GWH)			Demand at System Peak (MW)		
	CED 2006	Staff Draft	Percent Difference	CED 2006	Staff Draft	Percent Difference
1990	8,784	9,132	3.96%	1,475	1,533	3.96%
2000	9,998	10,824	8.26%	1,678	1,817	8.26%
2005	11,194	10,896	-2.66%	1,879	1,862	-0.93%
2008	11,699	11,946	2.11%	1,964	2,190	11.51%
2016	12,633	16,988	34.47%	2,121	2,874	35.53%
Annual Average Growth Rates						
1990-2000	1.30%	1.71%		1.30%	1.71%	
2000-2004	2.86%	0.17%		2.86%	0.61%	
2004-2008	1.11%	2.33%		1.11%	4.14%	
2004-2016	1.01%	3.77%		1.01%	3.69%	
Historic values are shaded						

### Historic Electricity Consumption Estimates

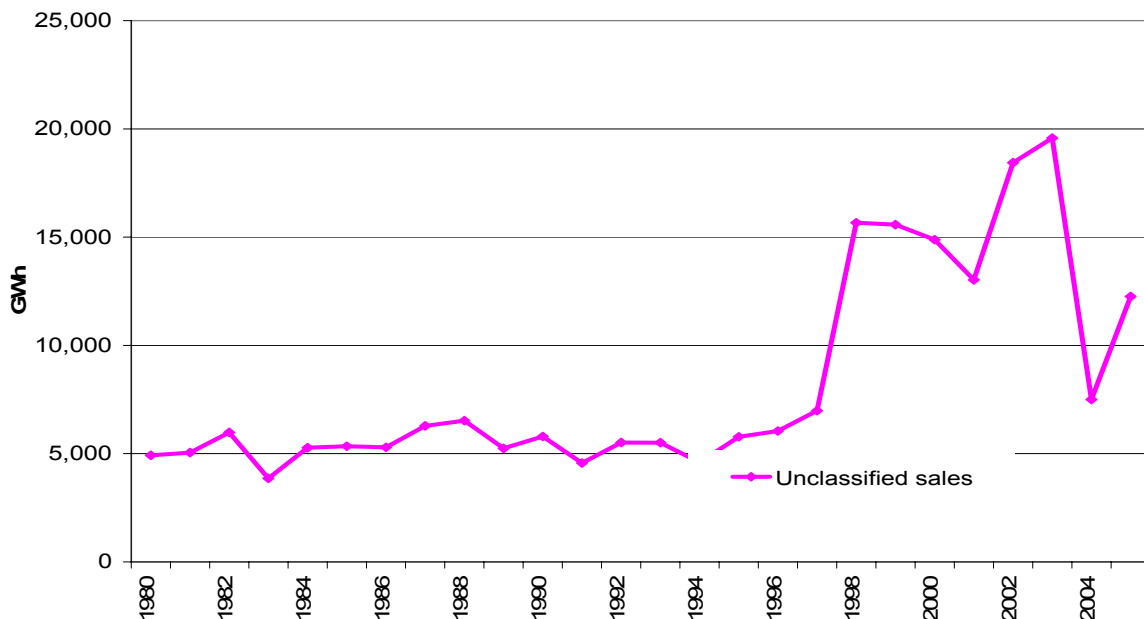
Energy Commission demand forecasting models are organized by sector according to economic activity (that is, commercial, industrial, agricultural, and so forth). Each of these forecasting models develops a forecast based on sub-activities within the sector (such as commercial building type or industrial activity). Under the Energy Commission's Quarterly Fuel and Reporting (QFER) regulations, each LSE is required to file monthly and annual reports that document energy consumption by activity group. In the past, this reporting was to conform to the Standard Industrial Classification (SIC) system. This system was revised to the North American

Industrial Classification System (NAICS).<sup>12</sup> The switch to NAICS has caused some difficulty in identifying the appropriate economic classification of many energy users. The result of this change, along with the lack of reporting regulation adherence by various LSEs, is a lower quality of the Energy Commission's historical record of sector specific consumption. Unclassified sales — consumption which the LSE has not identified by an NAICS category and that staff therefore cannot map to a customer sector — is now the fastest growing category of consumption reported to the Energy Commission.

Figure 1-10 shows the total statewide pattern of unclassified sales from 1980 to 2005. The largest increase coincided with the advent of the restructured electric industry. Under current reporting requirements, the IOUs are required to identify the economic classification of direct access customers and provide that information to the direct access provider. Much of the increase in unclassified sales is among direct access customers identified by the IOUs as “unclassified.”

Staff allocated unclassified to economic sectors using professional judgment. In the current forecast, unclassified sales were allocated to sectors to adjust for unrealistic changes in historic consumption. The CED 2006 forecast allocated unclassified sales in the summary model as a post-sector model adjustment. This change in allocation method has some impact on the commercial model results. If staff does not know more precisely how much electricity each economic sector is really using, it cannot correctly quantify the effects of energy efficiency programs or standards on demand or apply the correct load shapes for forecasting peak. The forecast may be over- or underestimating demand growth, depending on the true distribution of unclassified sales.

**Figure 1-10: Total Statewide Unclassified Sales**



## ***Demand Forecast Disaggregation***

Many of the uses of demand forecasts require more disaggregation than the planning area forecasts presented here. Electricity system analysis requires identification of load by congestion zone or load pocket. Evaluation of progress toward renewable energy goals requires sales data by individual LSEs. Development of energy efficiency goals requires projections of per capita sales by LSEs. Controlled grid studies require forecasts for each LSE, sometimes with geographic subdivisions. The statewide forms following this chapter include the forecast disaggregations developed by staff to support some of these applications.

With this forecast cycle, the staff has also begun the development of climate zone forecasts. Traditionally, only weather-sensitive end uses for the residential and commercial sectors have been forecast by climate zone. Staff has begun modifying its data and models to produce a more detailed climate zone forecast for all sectors. Because of the numerous modeling and data development challenges that have arisen, the climate zone forecasts are not published in this draft report, but will be part of the revised forecast.

Subsequent chapters present the forecast for each of the major electric planning areas and forms with detailed forecast results, followed by a chapter on the natural gas forecast. The planning areas used for this forecast are shown in Table 1-8.

**Table 1-8: Utilities within Forecasting Areas**

Planning Area	Utilities Included	
Electric Areas		
Pacific Gas and Electric (PG&E)	PG&E Alameda Biggs Calaveras Gridley Healdsburg Lassen MUD Lodi Lompoc Merced Modesto	Palo Alto Plumas – Sierra Redding Roseville San Francisco Shasta Silicon Valley Tuolumne Turlock Irrigation District Ukiah USBR-CVP
Sacramento Municipal Utility District (SMUD)	SMUD	
Southern California Edison (SCE)	Anaheim Anza Azusa Banning Colton MWD	Riverside Southern California Edison Southern California Water USBR-Parker Davis Valley Electric Vernon
Los Angeles Department of Water and Power (LADWP)	LADWP	
San Diego Gas and Electric (SDG&E)	SDG&E	
Cities of Burbank and Glendale	Burbank Glendale	
Pasadena	Pasadena	
Other Planning Area (OTHER)	Pacificorp Sierra Pacific Surprise Valley	Truckee-Donner Imperial Irrigation District (IID)
Department of Water Resources (DWR)	DWR	
Natural Gas Distribution Areas		
PG&E	PG&E Electric Planning Area SMUD	
SDG&E	SDG&E	
Southern California Gas Company (SCG)	SCG Long Beach	
OTHER	Avista Energy Southwest Gas Corporation	

<sup>1</sup> Peevey, Assigned Commissioner's Ruling on Interaction Between the CPUC Long-Term Planning Process and The California Energy Commission Integrated Energy Policy Report Process, September 9, 2004, California Public Utilities Commission Rulemaking 04-04-003.

<sup>2</sup> California Energy Commission, *California Energy Demand 2006–2016, Staff Energy Demand Forecast, Revised September 2005*, staff final report, publication no. CEC-400-2005-034-SF-ED2.

<sup>3</sup> California Energy Commission, *Staff Forecast of 2008 Peak Demand*, staff final report, publication no. CEC-200-2007-006-SF, June 18, 2007.

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<sup>4</sup> Southern California Edison, *EER and SEER as Predictors of Seasonal Cooling Performance*, December 15, 2003.

<sup>5</sup> California Energy Commission, *Energy Demand Forecast Methods Report*, publication no. CEC-400-2005-036, June 21, 2005.

<sup>6</sup> State of California, Department of Finance, *P-1 Population Projections by Race/Ethnicity for California and Its Counties 2000–2050*, Sacramento, California, May 2004.

<sup>7</sup> State of California, Department of Finance, *E-5 City/County Population and Housing Estimates*, Revised 2001–2004, with 2000 DRU Benchmark, May 2005.

<sup>8</sup> California Public Utilities Commission, *Interim Opinion: Energy Savings Goals for Program Year 2006 and Beyond*, D. 04-09-040, September 23, 2004, in Energy Efficiency Rulemaking 01-08-028.

<sup>9</sup> PV characteristics are described in Appendix E and G of the California Energy Commission *Scenario Analysis of California's Electricity System: Preliminary Results for the 2007 IEPR*, staff draft report, publication no. CEC-200-2007-010-SD, June 8, 2007.

<sup>10</sup> Rule 21 Statistics - Approved and Pending,

<[http://www.energy.ca.gov/distgen/interconnection/rule21\\_stats.html](http://www.energy.ca.gov/distgen/interconnection/rule21_stats.html)>

<sup>11</sup> ITRON, *CPUC Self-Generation Incentive Program Fourth-Year Impact Report*, final report, submitted to Southern California Edison and The Self-Generation Incentive Program Working Group, April 15, 2005.

<sup>12</sup> As a result of NAFTA, the federal government replaced the SIC system with the NAICS system. In turn, the Energy Commission modified its regulations requiring utilities to classify all end users from SIC to NAICS to allow economic data to be matched to utility consumption data.

**Form 1.1 - Statewide**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Electricity Consumption by Sector (GWh)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	TCU	Streetlighting	Total Consumption
1980	52,082	47,600	40,771	4,104	13,737	7,956	1,685	167,935
1981	53,494	50,419	41,350	4,387	16,402	8,261	1,643	175,957
1982	52,573	50,297	37,784	6,061	14,507	8,760	1,705	171,688
1983	54,577	52,023	38,624	6,322	11,610	9,137	1,603	173,896
1984	57,564	55,092	40,411	6,978	15,320	9,766	1,535	186,666
1985	58,528	56,907	41,496	7,329	17,453	10,423	1,537	193,673
1986	58,452	59,306	42,232	6,514	15,940	10,084	1,512	194,038
1987	61,267	62,949	44,182	6,463	16,409	11,058	1,536	203,865
1988	64,033	65,958	46,421	6,535	17,995	11,465	1,494	213,902
1989	65,316	68,932	46,942	6,719	19,225	12,087	1,507	220,728
1990	67,667	72,752	47,384	7,277	20,774	12,430	1,580	229,865
1991	67,142	72,540	46,004	7,269	16,266	12,640	1,614	223,475
1992	69,225	76,018	45,928	6,972	15,471	12,967	1,652	228,234
1993	68,424	76,604	45,532	6,687	15,902	13,059	1,648	227,856
1994	69,774	76,687	45,388	6,264	16,948	12,842	1,649	229,552
1995	69,770	78,409	46,834	6,481	14,301	13,238	1,624	230,657
1996	72,164	80,709	47,207	6,620	16,874	13,293	1,660	238,526
1997	73,547	84,442	48,847	6,565	17,514	13,914	1,701	246,531
1998	75,387	86,330	47,294	6,232	13,485	13,608	1,758	244,095
1999	76,482	89,466	48,695	5,863	17,097	13,921	1,658	253,182
2000	80,612	95,148	49,942	6,324	17,532	14,486	1,730	265,773
2001	75,916	90,095	44,740	5,775	18,921	12,869	1,727	250,042
2002	77,731	93,009	45,557	5,713	21,057	13,152	1,715	257,934
2003	82,196	96,860	43,353	5,917	20,274	13,176	1,751	263,526
2004	84,812	99,768	44,029	6,618	21,971	12,398	1,775	271,373
2005	86,087	99,994	44,475	6,735	19,261	14,155	1,785	272,491
2006	89,075	102,881	44,775	7,087	20,851	14,278	1,793	280,739
2007	90,824	104,393	44,921	7,057	20,882	14,424	1,804	284,305
2008	92,597	105,899	45,509	7,073	20,907	14,570	1,816	288,370
2009	94,400	107,484	46,028	7,080	20,944	14,714	1,827	292,478
2010	96,142	108,994	46,401	7,061	20,981	14,858	1,838	296,273
2011	97,876	110,461	46,930	7,032	21,031	15,001	1,848	300,179
2012	99,550	111,927	47,211	6,990	21,080	15,144	1,858	303,760
2013	101,175	113,330	47,582	6,938	21,129	15,285	1,868	307,308
2014	102,804	114,750	47,719	6,888	21,164	15,425	1,877	310,627
2015	104,435	116,201	47,982	6,838	21,211	15,564	1,887	314,117
2016	106,054	117,624	48,160	6,789	21,251	15,702	1,896	317,477
2017	107,668	119,030	48,304	6,738	21,285	15,839	1,905	320,769
2018	109,286	121,540	48,322	6,683	21,318	15,974	1,913	325,036

Last Historic Year = 2005; Consumption includes self-generatic

**Annual Growth Rates (%)**

1980-1990	2.7	4.3	1.5	5.9	4.2	4.6	-0.6	3.2
1990-2000	1.8	2.7	0.5	-1.4	-1.7	1.5	0.9	1.5
2000-2005	1.3	1.0	-2.3	1.3	1.9	-0.5	0.6	0.5
2005-2008	2.5	1.9	0.8	1.6	2.8	1.0	0.6	1.9
2008-2018	1.7	1.4	0.6	-0.6	0.2	0.9	0.5	1.2
2005-2018	1.9	1.5	0.6	-0.1	0.8	0.9	0.5	1.4



**Form 1.1b - Statewide**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Electricity Sales by Sector (GWh)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	TCU	Streetlighting	Total Consumption
1980	52,082	47,574	39,823	4,104	13,737	7,956	1,685	166,961
1981	53,494	50,394	40,383	4,387	16,402	8,258	1,643	174,961
1982	52,573	50,255	36,658	6,015	14,507	8,657	1,705	170,370
1983	54,577	51,872	36,788	6,215	11,606	9,019	1,603	171,681
1984	57,564	54,889	38,471	6,739	15,317	9,601	1,535	184,114
1985	58,527	56,596	39,386	7,032	17,446	10,176	1,537	190,701
1986	58,449	58,924	39,576	5,927	15,931	9,730	1,512	190,048
1987	61,263	62,376	40,389	5,633	16,398	10,605	1,536	198,200
1988	64,028	65,076	40,850	5,570	17,978	10,943	1,494	205,940
1989	65,310	67,994	41,025	5,422	19,207	11,530	1,507	211,995
1990	67,661	71,694	41,372	5,844	20,756	11,826	1,580	220,734
1991	67,135	71,439	40,077	5,748	16,247	12,028	1,614	214,288
1992	69,219	74,890	40,052	5,464	15,451	12,377	1,652	219,106
1993	68,417	75,415	38,690	5,251	15,886	12,393	1,648	217,699
1994	69,774	75,266	38,300	4,830	16,933	12,171	1,649	218,922
1995	69,770	76,933	39,677	5,051	14,286	12,535	1,624	219,876
1996	72,164	79,291	39,460	5,157	16,859	12,730	1,660	227,321
1997	73,546	82,980	41,022	5,032	17,499	13,343	1,701	235,125
1998	75,387	84,833	39,709	4,670	13,471	13,097	1,758	232,925
1999	76,482	87,937	40,991	4,388	17,097	13,428	1,658	241,982
2000	80,612	93,628	42,603	4,857	17,532	13,988	1,730	254,949
2001	75,916	89,485	37,985	3,705	18,921	12,404	1,727	240,143
2002	77,731	92,138	37,509	3,419	21,057	12,732	1,715	246,301
2003	82,196	95,953	34,899	3,497	20,274	12,731	1,751	251,301
2004	84,812	98,895	36,717	4,202	21,971	11,994	1,775	260,367
2005	86,087	99,063	37,224	4,399	19,261	13,776	1,785	261,595
2006	89,071	101,844	37,381	4,703	20,851	13,888	1,793	269,530
2007	90,816	103,196	37,403	4,631	20,882	14,026	1,804	272,758
2008	92,584	104,480	37,868	4,605	20,907	14,162	1,816	276,421
2009	94,381	105,779	38,264	4,570	20,944	14,297	1,827	280,063
2010	96,115	106,939	38,514	4,508	20,981	14,431	1,838	283,327
2011	97,842	107,991	38,920	4,437	21,031	14,566	1,848	286,634
2012	99,507	109,004	39,126	4,368	21,080	14,703	1,858	289,645
2013	101,122	109,890	39,421	4,289	21,129	14,839	1,868	292,559
2014	102,741	110,734	39,493	4,214	21,164	14,975	1,877	295,197
2015	104,360	111,541	39,684	4,138	21,211	15,109	1,887	297,930
2016	105,967	112,259	39,795	4,065	21,251	15,243	1,896	300,475
2017	107,567	112,896	39,875	3,990	21,285	15,375	1,905	302,894
2018	109,171	114,546	39,796	3,900	21,318	15,504	1,913	306,149

Last Historic Year = 2005; Sales excludes self-generatic

**Annual Growth Rates (%)**

1980-1990	2.7	4.2	0.4	3.6	4.2	4.0	-0.6	2.8
1990-2000	1.8	2.7	0.3	-1.8	-1.7	1.7	0.9	1.5
2000-2005	1.3	1.1	-2.7	-2.0	1.9	-0.3	0.6	0.5
2005-2008	2.5	1.8	0.6	1.5	2.8	0.9	0.6	1.9
2008-2018	1.7	0.9	0.5	-1.6	0.2	0.9	0.5	1.0
2005-2018	1.8	1.1	0.5	-0.9	0.8	0.9	0.5	1.2

**Form 1.2 - Statewide**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Net Energy for Load (GWh)**

	Total Consumption	Net Losses	Gross Generation	Private Supply	Net Energy for Load
1980	166,491	14,286	180,776	974	179,803
1981	174,495	14,885	189,379	996	188,384
1982	170,255	14,509	184,763	1,317	183,446
1983	172,555	14,746	187,301	2,215	185,086
1984	185,276	15,771	201,047	2,552	198,495
1985	192,319	16,225	208,544	2,973	205,572
1986	192,713	16,161	208,874	3,990	204,884
1987	202,569	16,877	219,446	5,664	213,781
1988	212,547	17,463	230,010	7,962	222,048
1989	219,408	17,893	237,301	8,733	228,568
1990	228,473	18,582	247,055	9,132	237,923
1991	222,098	18,205	240,302	9,186	231,116
1992	226,819	18,633	245,452	9,128	236,323
1993	226,403	18,481	244,884	10,156	234,728
1994	228,083	18,473	246,556	10,629	235,927
1995	229,158	18,651	247,809	10,781	237,028
1996	236,943	19,180	256,123	11,206	244,917
1997	244,994	19,830	264,824	11,406	253,418
1998	242,561	19,714	262,275	11,170	251,105
1999	251,576	20,373	271,949	11,201	260,748
2000	264,229	21,419	285,648	10,824	274,824
2001	248,394	20,209	268,603	9,899	258,704
2002	256,116	20,666	276,783	11,633	265,150
2003	261,866	21,086	282,953	12,225	270,727
2004	269,629	21,824	291,454	11,006	280,448
2005	270,742	21,944	292,686	10,896	281,790
2006	280,739	22,761	303,499	11,208	292,291
2007	284,305	23,032	307,337	11,547	295,790
2008	288,370	23,336	311,706	11,949	299,756
2009	292,478	23,637	316,115	12,415	303,700
2010	296,273	23,907	320,180	12,947	307,233
2011	300,179	24,181	324,359	13,544	310,815
2012	303,760	24,428	328,188	14,115	314,074
2013	307,308	24,668	331,976	14,749	317,228
2014	310,627	24,885	335,512	15,430	320,082
2015	314,117	25,109	339,227	16,188	323,039
2016	317,477	25,319	342,796	17,002	325,794
2017	320,769	25,518	346,288	17,875	328,413
2018	325,036	25,786	350,822	18,887	331,935

**Annual Growth Rates (%)**

1980-1990	3.2	2.7	3.2	25.1	2.8
1990-2000	1.5	1.4	1.5	1.7	1.5
2000-2005	0.5	0.5	0.5	0.1	0.5
2005-2008	2.1	2.1	2.1	3.1	2.1
2008-2018	1.2	1.0	1.2	4.7	1.0
2005-2018	1.4	1.2	1.4	4.3	1.3

**Form 1.3 - Statewide**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Coincident Peak Demand by Sector (MW)**

Year	Residential	Commercial	Industrial	Agricultural	Other	Total Demand
1980	12,436	10,267	6,528	1,904	1,488	32,281
1981	12,294	11,469	6,763	1,972	1,665	33,792
1982	11,094	10,835	6,538	1,610	1,805	31,524
1983	12,238	11,605	6,865	1,398	1,645	33,365
1984	13,475	12,914	7,391	1,873	1,822	37,054
1985	13,798	12,452	7,039	2,102	2,074	37,061
1986	12,984	12,560	7,219	1,829	1,978	36,167
1987	13,286	12,856	7,332	1,889	2,051	36,998
1988	15,521	14,215	7,503	2,063	2,236	41,104
1989	14,497	14,490	7,419	1,775	2,373	40,158
1990	16,308	16,060	7,950	2,082	2,452	44,365
1991	15,390	15,371	7,669	2,084	2,292	42,362
1992	16,478	16,272	7,809	1,984	2,288	44,361
1993	15,666	15,470	7,629	1,901	2,297	42,580
1994	17,168	16,074	7,585	2,065	2,348	44,817
1995	17,495	16,241	7,776	1,764	2,210	45,074
1996	18,312	16,956	7,952	1,950	2,425	47,164
1997	19,540	17,826	7,963	1,947	2,544	49,354
1998	20,123	19,348	8,191	1,667	2,418	51,254
1999	19,720	18,638	7,767	1,909	2,596	50,146
2000	20,278	19,266	7,332	1,655	2,533	50,592
2001	18,786	17,463	6,774	2,007	2,350	46,961
2002	20,194	18,515	7,167	2,069	2,685	50,185
2003	20,731	20,344	7,096	1,611	2,803	52,131
2004	19,967	21,010	7,879	1,863	2,805	53,034
2005	22,958	20,758	7,309	1,824	2,815	55,155
2006	25,380	21,914	8,127	2,109	3,046	60,041
2007	24,894	21,349	7,831	2,031	2,984	58,557
2008	25,382	21,621	7,925	2,034	3,006	59,433
2009	25,879	21,900	8,005	2,038	3,028	60,313
2010	26,370	22,164	8,056	2,043	3,050	61,145
2011	26,885	22,420	8,129	2,050	3,072	62,015
2012	27,393	22,678	8,162	2,056	3,094	62,843
2013	27,899	22,926	8,207	2,062	3,116	63,668
2014	28,406	23,178	8,216	2,064	3,137	64,459
2015	28,913	23,436	8,245	2,069	3,159	65,279
2016	29,412	23,689	8,261	2,073	3,180	66,071
2017	29,910	23,940	8,270	2,076	3,201	66,851
2018	30,395	24,526	8,260	2,079	3,222	67,948

**Annual Growth Rates (%)**

1980-1990	2.7	4.6	2.0	0.9	5.1	3.2
1990-2000	2.2	1.8	-0.8	-2.3	0.3	1.3
2000-2005	2.5	1.5	-0.1	2.0	2.1	1.7
2005-2008	3.4	1.4	2.7	3.7	2.2	2.5
2008-2018	1.8	1.3	0.4	0.2	0.7	1.3
2005-2018	2.2	1.3	0.9	1.0	1.0	1.6

**Form 1.4 - Statewide  
California Energy Demand 2008-2018 Staff Draft Forecast  
Peak Demand (MW)**

Year	Total End Use Load	Net Losses	Gross Generation	Private Supply	Net Peak Demand	Load Factor (%)
1980	32,641	2,881	35,162	163	34,999	58.6
1981	34,182	3,008	36,800	167	36,633	58.7
1982	31,900	2,798	34,323	221	34,101	61.4
1983	33,770	2,958	36,324	372	35,952	58.8
1984	37,495	3,300	40,795	428	40,367	56.1
1985	37,489	3,295	40,784	499	40,285	58.3
1986	36,597	3,193	39,790	670	39,120	59.8
1987	37,445	3,246	40,691	951	39,740	61.4
1988	41,575	3,579	45,153	1,337	43,817	57.9
1989	40,596	3,472	44,069	1,466	42,602	61.2
1990	44,901	3,842	48,742	1,533	47,209	57.5
1991	42,856	3,673	46,528	1,542	44,986	58.6
1992	44,883	3,837	48,720	1,532	47,188	57.2
1993	43,015	3,672	46,686	1,705	44,981	59.6
1994	45,302	3,852	49,154	1,784	47,370	56.9
1995	45,547	3,887	49,434	1,810	47,624	56.8
1996	47,651	4,066	51,718	1,881	49,836	56.1
1997	49,879	4,261	54,140	1,915	52,225	55.4
1998	51,807	4,443	56,250	1,875	54,374	52.7
1999	50,670	4,340	55,010	1,880	53,129	56.0
2000	51,100	4,377	55,478	1,817	53,661	58.5
2001	47,414	4,062	51,476	1,662	49,814	59.3
2002	50,668	4,328	54,997	1,953	53,044	57.1
2003	52,628	4,479	57,106	2,052	55,054	56.1
2004	53,557	4,572	58,129	1,848	56,282	56.9
2005	55,707	4,757	60,464	1,862	58,602	54.9
2006	60,618	5,192	65,810	2,001	63,809	52.3
2007	59,132	5,046	64,178	2,096	62,082	54.4
2008	60,012	5,114	65,126	2,191	62,935	54.4
2009	60,895	5,184	66,078	2,286	63,792	54.3
2010	61,729	5,248	66,977	2,381	64,596	54.3
2011	62,601	5,317	67,918	2,476	65,442	54.2
2012	63,429	5,383	68,812	2,557	66,255	54.1
2013	64,257	5,449	69,705	2,639	67,067	54.0
2014	65,048	5,511	70,559	2,717	67,842	53.9
2015	65,869	5,577	71,446	2,798	68,648	53.7
2016	66,663	5,640	72,302	2,877	69,426	53.6
2017	67,444	5,702	73,146	2,956	70,190	53.4
2018	68,529	5,790	74,319	3,044	71,275	53.2

2006=Last historic year

**Annual Growth Rates (%)**

1980-1990	3.2	2.9	3.3	25.1	3.0	-0.2
1990-2000	1.3	1.3	1.3	1.7	1.3	0.2
2000-2005	1.7	1.7	1.7	0.5	1.8	-1.3
2005-2008	2.5	2.4	2.5	5.6	2.4	-0.3
2008-2018	1.3	1.2	1.3	3.3	1.3	-0.2
2005-2018	1.6	1.5	1.6	3.9	1.5	-0.2

**Form 1.5a**  
**California Energy Demand 2008-2018 Demand Forecast - Staff Draft**  
**Net Energy for Load by Control Area**  
**(GWh)**

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Growth Rate 2008-2018
<b>PG&amp;E North</b>	94,390	95,683	96,970	98,283	99,451	100,715	101,820	102,894	103,849	104,850	105,799	106,692	107,763	1.1%
PG&E Bundled Customers	72,528	73,660	74,790	75,940	76,962	78,039	78,976	79,884	80,688	81,529	82,324	83,069	83,959	1.2%
PG&E Direct Access	9,274	9,274	9,274	9,274	9,274	9,274	9,274	9,274	9,274	9,274	9,274	9,274	9,274	0.0%
PG&E San Francisco	5,205	5,255	5,299	5,349	5,394	5,471	5,543	5,616	5,685	5,757	5,829	5,899	5,987	1.2%
Northern California Power Agency	2,062	2,093	2,124	2,156	2,184	2,215	2,242	2,268	2,291	2,315	2,338	2,360	2,386	1.2%
Silicon Valley Power	2,653	2,693	2,733	2,774	2,811	2,850	2,885	2,918	2,948	2,979	3,009	3,036	3,070	1.2%
Other Publicly Owned Utilities	2,668	2,708	2,748	2,790	2,826	2,866	2,900	2,934	2,964	2,995	3,025	3,053	3,087	1.2%
Dept of Water Resources - North	1,558	1,558	1,558	1,558	1,558	1,558	1,558	1,558	1,558	1,558	1,558	1,558	1,558	0.0%
<b>Total North of Path 15</b>	95,948	97,241	98,528	99,841	101,009	102,273	103,378	104,452	105,407	106,408	107,357	108,250	109,321	1.0%
<b>Path 26 Pacific Gas &amp; Electric - South</b>	5,851	5,940	6,028	6,119	6,199	6,286	6,362	6,435	6,501	6,570	6,635	6,697	6,770	1.2%
Path 26 - Dept of Water Resources	2,575	2,575	2,575	2,575	2,575	2,575	2,575	2,575	2,575	2,575	2,575	2,575	2,575	0.0%
<b>Total Zone Path 26</b>	8,425	8,514	8,603	8,693	8,773	8,860	8,936	9,010	9,076	9,144	9,210	9,271	9,345	0.8%
<b>Total NP15</b>	104,373	105,756	107,130	108,534	109,782	111,133	112,314	113,462	114,483	115,552	116,566	117,521	118,666	1.0%
<b>Southern California Edison Planning Area</b>	104,110	105,268	106,808	108,309	109,652	110,955	112,149	113,291	114,311	115,378	116,344	117,255	118,571	1.1%
SCE Bundled Customers	80,881	81,900	83,255	84,575	85,756	86,902	87,952	88,957	89,854	90,792	91,642	92,443	93,601	1.2%
SCE Direct Access	10,921	10,921	10,921	10,921	10,921	10,921	10,921	10,921	10,921	10,921	10,921	10,921	10,921	0.0%
Anaheim Public Utilities Dept.	2,727	2,761	2,802	2,852	2,891	2,930	2,966	2,999	3,030	3,061	3,090	3,117	3,156	1.2%
Riverside Utilities Dept	2,124	2,151	2,187	2,221	2,253	2,283	2,310	2,337	2,360	2,385	2,407	2,428	2,459	1.2%
Vernon Municipal Light Dept	1,962	1,987	2,020	2,052	2,080	2,108	2,134	2,158	2,180	2,203	2,223	2,243	2,271	1.2%
Metropolitan Water District	1,228	1,228	1,228	1,228	1,228	1,228	1,228	1,228	1,228	1,228	1,228	1,228	1,228	0.0%
Other Publicly Owned Utilities	4,265	4,319	4,390	4,460	4,522	4,582	4,638	4,691	4,738	4,788	4,832	4,875	4,936	1.2%
Pasadena Water and Power Dept	1,307	1,312	1,322	1,329	1,335	1,340	1,343	1,346	1,349	1,354	1,355	1,359	1,368	0.3%
San Diego Gas & Electric	21,408	21,714	22,046	22,365	22,656	22,912	23,172	23,411	23,639	23,861	24,072	24,265	24,571	1.1%
SDG&E Bundled Customers	17,668	17,974	18,307	18,625	18,916	19,173	19,432	19,671	19,899	20,122	20,332	20,525	20,831	1.3%
SDG&E Direct Access	3,740	3,740	3,740	3,740	3,740	3,740	3,740	3,740	3,740	3,740	3,740	3,740	3,740	0.0%
Dept of Water Resources - South	5,109	5,109	5,109	5,109	5,109	5,109	5,109	5,109	5,109	5,109	5,109	5,109	5,109	0.0%
<b>Total South of Path 15</b>	131,933	133,403	135,285	137,112	138,752	140,316	141,773	143,158	144,408	145,702	146,881	147,988	149,618	1.0%
<b>Turlock Irrigation District Control Area</b>	2,849	2,892	2,935	2,979	3,018	3,061	3,097	3,133	3,165	3,199	3,231	3,261	3,296	
Sacramento Municipal Utilities District	11,644	11,920	12,205	12,511	12,812	13,136	13,461	13,787	14,111	14,433	14,745	15,051	15,424	2.4%
WAPA	2,406	2,406	2,406	2,406	2,406	2,406	2,406	2,406	2,406	2,406	2,406	2,406	2,406	0.0%
Redding	878	892	905	919	931	944	955	966	976	986	996	1,005	1,017	1.2%
Roseville	1,323	1,344	1,364	1,384	1,402	1,422	1,439	1,456	1,471	1,486	1,501	1,515	1,531	1.2%
Shasta	253	257	261	265	268	272	275	279	282	284	287	290	293	1.2%
Modesto Irrigation District	2,871	2,914	2,958	3,002	3,042	3,084	3,121	3,158	3,190	3,224	3,256	3,286	3,322	1.2%
<b>Total SMUD/WAPA Control Area</b>	19,376	19,733	20,099	20,486	20,861	21,263	21,658	22,051	22,435	22,820	23,191	23,552	23,993	1.8%
<b>Los Angeles Department of Water and Power</b>	27,707	27,872	28,087	28,289	28,448	28,593	28,709	28,825	28,918	29,012	29,097	29,187	29,359	0.4%
Burbank Public Service Dept	1,243	1,247	1,254	1,260	1,264	1,268	1,270	1,273	1,275	1,278	1,279	1,282	1,286	0.3%
Glendale Public Service Dept	1,195	1,198	1,205	1,210	1,214	1,218	1,220	1,223	1,225	1,227	1,229	1,231	1,236	0.3%
<b>Total LADWP Control Area</b>	30,145	30,318	30,545	30,759	30,926	31,079	31,199	31,322	31,417	31,517	31,605	31,700	31,882	0.4%
<b>Imperial Irrigation District Control Area</b>	3,615	3,689	3,762	3,829	3,894	3,962	4,032	4,101	4,174	4,249	4,320	4,391	4,479	1.8%
<b>Total CAISO</b>	236,306	239,158	242,415	245,646	248,534	251,449	254,087	256,620	258,891	261,254	263,447	265,509	268,284	1.0%
<b>Total State</b>	292,291	295,790	299,756	303,700	307,233	310,815	314,074	317,228	320,082	323,039	325,794	328,413	331,935	1.0%

**Form 1.5b**  
**California Energy Demand 2008-2018 Demand Forecast - Staff Draft**  
**1-in-2 Electric Peak Demand by Control Area**  
**(MW)**

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Growth Rate 2008-2018
PG&E North	19,722	19,986	20,260	20,517	20,813	21,089	21,368	21,631	21,909	22,184	22,453	22,791	1.3%
PG&E Bundled Customers	16,660	16,881	17,123	17,350	17,611	17,855	18,101	18,333	18,578	18,820	19,058	19,356	1.4%
PG&E Direct Access	950	950	950	950	950	950	950	950	950	950	950	950	0.0%
PG&E San Francisco	877	889	901	912	925	937	950	961	973	986	997	1,012	1.3%
Northern California Power Agency	487	493	500	506	513	520	527	533	540	547	553	562	1.3%
Silicon Valley Power	470	477	483	489	496	503	509	516	522	529	535	543	1.3%
Other Publicly Owned Utilities	277	296	303	310	317	324	331	338	345	352	359	368	2.2%
Dept of Water Resources - North	141	141	141	141	141	141	141	141	141	141	141	141	0.0%
<b>Total North of Path 15</b>	<b>19,863</b>	<b>20,127</b>	<b>20,401</b>	<b>20,659</b>	<b>20,954</b>	<b>21,230</b>	<b>21,509</b>	<b>21,773</b>	<b>22,050</b>	<b>22,325</b>	<b>22,594</b>	<b>22,932</b>	1.3%
Path 26 Pacific Gas & Electric - South	1,320	1,338	1,357	1,375	1,395	1,414	1,434	1,452	1,472	1,491	1,510	1,533	1.4%
Path 26 - Dept of Water Resources	233	233	233	233	233	233	233	233	233	233	233	233	0.0%
<b>Total Zone Path 26</b>	<b>1,553</b>	<b>1,571</b>	<b>1,590</b>	<b>1,608</b>	<b>1,629</b>	<b>1,648</b>	<b>1,667</b>	<b>1,686</b>	<b>1,705</b>	<b>1,724</b>	<b>1,743</b>	<b>1,767</b>	1.2%
<b>Total NP15</b>	<b>21,416</b>	<b>21,698</b>	<b>21,991</b>	<b>22,267</b>	<b>22,583</b>	<b>22,878</b>	<b>23,176</b>	<b>23,458</b>	<b>23,755</b>	<b>24,049</b>	<b>24,337</b>	<b>24,699</b>	1.3%
Southern California Edison Planning Area	22,806	23,142	23,472	23,778	24,084	24,381	24,674	24,951	25,240	25,513	25,781	26,209	1.3%
SCE Bundled Customers	19,433	19,733	20,037	20,320	20,602	20,875	21,145	21,401	21,667	21,919	22,166	22,560	1.3%
SCE Direct Access	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600	0.0%
Anaheim Public Utilities Dept.	589	598	607	615	622	630	638	645	652	659	666	677	1.3%
Riverside Utilities Dept	576	584	593	600	608	616	623	630	637	644	651	662	1.3%
Vernon Municipal Light Dept	178	181	183	186	188	191	193	195	197	199	201	205	1.3%
Metropolitan Water District	200	200	200	200	200	200	200	200	200	200	200	200	0.0%
Other Publicly Owned Utilities	229	245	252	258	264	269	275	280	286	291	296	304	2.2%
Pasadena Water and Power Dept	329	332	334	335	337	338	339	340	342	342	342	343	0.3%
San Diego Gas & Electric	4,507	4,578	4,648	4,714	4,775	4,838	4,899	4,960	5,023	5,084	5,145	5,247	1.4%
SDG&E Bundled Customers	3,957	4,028	4,098	4,164	4,225	4,288	4,349	4,410	4,473	4,534	4,595	4,697	1.5%
SDG&E Direct Access	550	550	550	550	550	550	550	550	550	550	550	550	0.0%
Dept of Water Resources - South	463	463	463	463	463	463	463	463	463	463	463	463	0.0%
<b>Total South of Path 15</b>	<b>28,105</b>	<b>28,515</b>	<b>28,916</b>	<b>29,291</b>	<b>29,660</b>	<b>30,020</b>	<b>30,375</b>	<b>30,715</b>	<b>31,067</b>	<b>31,403</b>	<b>31,731</b>	<b>32,262</b>	1.2%
<b>Turlock Irrigation District Control Area</b>	<b>574</b>	<b>582</b>	<b>590</b>	<b>597</b>	<b>606</b>	<b>614</b>	<b>622</b>	<b>629</b>	<b>637</b>	<b>645</b>	<b>653</b>	<b>663</b>	1.3%
Sacramento Municipal Utilities District	3,128	3,207	3,289	3,371	3,461	3,553	3,645	3,736	3,827	3,913	3,996	4,098	2.5%
WAPA	219	219	219	219	219	219	219	219	219	219	219	219	0.0%
Redding	247	250	254	257	261	264	267	271	274	278	281	285	1.3%
Roseville	335	340	344	349	354	358	363	367	372	377	381	387	1.3%
Shasta	30	31	31	31	32	32	33	33	34	34	34	35	1.3%
Modesto Irrigation District	671	680	690	698	708	718	727	736	745	755	764	775	1.3%
<b>Total SMUD/WAPA Control Area</b>	<b>4,630</b>	<b>4,726</b>	<b>4,826</b>	<b>4,925</b>	<b>5,034</b>	<b>5,143</b>	<b>5,253</b>	<b>5,362</b>	<b>5,471</b>	<b>5,574</b>	<b>5,675</b>	<b>5,799</b>	
Los Angeles Department of Water and Po	5,834	5,872	5,907	5,936	5,961	5,983	6,005	6,024	6,044	6,063	6,083	6,132	0.4%
Burbank Public Service Dept	294	296	297	298	300	300	301	301	302	302	303	297	0.0%
Glendale Public Service Dept	310	312	314	315	316	317	317	318	319	319	320	313	0.0%
<b>Total LADWP Control Area</b>	<b>6,438</b>	<b>6,480</b>	<b>6,518</b>	<b>6,549</b>	<b>6,576</b>	<b>6,600</b>	<b>6,624</b>	<b>6,643</b>	<b>6,665</b>	<b>6,684</b>	<b>6,706</b>	<b>6,743</b>	
<b>Imperial Irrigation District Control Area</b>	<b>917</b>	<b>935</b>	<b>951</b>	<b>967</b>	<b>983</b>	<b>1,000</b>	<b>1,017</b>	<b>1,034</b>	<b>1,052</b>	<b>1,070</b>	<b>1,088</b>	<b>1,109</b>	1.7%
<b>Total CAISO</b>	<b>49,522</b>	<b>50,213</b>	<b>50,908</b>	<b>51,558</b>	<b>52,243</b>	<b>52,898</b>	<b>53,551</b>	<b>54,173</b>	<b>54,823</b>	<b>55,452</b>	<b>56,068</b>	<b>56,961</b>	#DIV/0!
<b>Total State</b>	<b>62,082</b>	<b>62,935</b>	<b>63,792</b>	<b>64,596</b>	<b>65,442</b>	<b>66,255</b>	<b>67,067</b>	<b>67,842</b>	<b>68,648</b>	<b>69,426</b>	<b>70,190</b>	<b>71,275</b>	1.8%
<b>Total CAISO Coincident Demand</b>	48,336	49,011	49,688	50,323	50,991	51,631	52,269	52,876	53,510	54,124	54,726	55,597	1.7%
<b>Total Statewide Coincident Demand</b>	60,595	61,428	62,265	63,049	63,875	64,668	65,461	66,218	67,004	67,763	68,509	69,568	2.5%

**Form 1.5c**  
**California Energy Demand 2008-2018 Demand Forecast - Staff Draft**  
**1-in-10 Electric Peak Demand by Control Area**  
**(MW)**

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Growth Rate 2008-2018
PG&E North	20,458	20,732	21,016	21,284	21,590	21,877	22,166	22,439	22,727	23,012	23,292	23,642	1.3%
PG&E Bundled Customers	17,283	17,512	17,763	17,998	18,269	18,522	18,777	19,018	19,272	19,523	19,770	20,079	1.4%
PG&E Direct Access	985	985	985	985	985	985	985	985	985	985	985	985	0.0%
PG&E San Francisco	910	922	934	946	960	972	985	997	1,010	1,022	1,035	1,050	1.3%
Northern California Power Agency	505	511	518	525	532	539	547	553	560	567	574	583	1.3%
Silicon Valley Power	488	494	501	507	515	521	528	535	542	548	555	563	1.3%
Other Publicly Owned Utilities	288	307	314	321	329	336	344	351	358	366	373	382	2.2%
Dept of Water Resources - North	141	141	141	141	141	141	141	141	141	141	141	141	0.0%
<b>Total North of Path 15</b>	<b>20,600</b>	<b>20,873</b>	<b>21,158</b>	<b>21,425</b>	<b>21,731</b>	<b>22,018</b>	<b>22,307</b>	<b>22,580</b>	<b>22,869</b>	<b>23,154</b>	<b>23,433</b>	<b>23,783</b>	<b>1.3%</b>
Path 26 Pacific Gas & Electric - South	1,320	1,338	1,357	1,375	1,395	1,414	1,434	1,452	1,472	1,491	1,510	1,533	1.4%
Path 26 - Dept of Water Resources	233	233	233	233	233	233	233	233	233	233	233	233	0.0%
<b>Total Zone Path 26</b>	<b>1,553</b>	<b>1,571</b>	<b>1,590</b>	<b>1,608</b>	<b>1,629</b>	<b>1,648</b>	<b>1,667</b>	<b>1,686</b>	<b>1,705</b>	<b>1,724</b>	<b>1,743</b>	<b>1,767</b>	<b>1.2%</b>
<b>Total NP15</b>	<b>22,153</b>	<b>22,444</b>	<b>22,748</b>	<b>23,033</b>	<b>23,360</b>	<b>23,666</b>	<b>23,974</b>	<b>24,266</b>	<b>24,574</b>	<b>24,878</b>	<b>25,176</b>	<b>25,550</b>	<b>1.3%</b>
Southern California Edison Planning Area:	23,407	24,604	24,966	25,321	25,652	25,983	26,302	26,618	26,917	27,229	27,524	27,813	1.2%
SCE Bundled Customers	19,110	20,990	21,313	21,639	21,943	22,246	22,539	22,829	23,104	23,390	23,661	23,926	1.3%
SCE Direct Access	1,600	1,730	1,732	1,734	1,736	1,738	1,739	1,741	1,743	1,744	1,746	1,747	0.1%
Anaheim Public Utilities Dept.	580	637	646	655	664	672	681	689	697	705	712	720	1.2%
Riverside Utilities Dept	563	622	631	640	648	657	665	673	680	688	696	703	1.2%
Vernon Municipal Light Dept	175	178	181	183	186	188	191	193	195	197	199	201	1.2%
Metropolitan Water District	200	200	200	200	200	200	200	200	200	200	200	200	0.0%
Other Publicly Owned Utilities	205	246	262	269	275	281	287	293	299	304	310	315	2.5%
Pasadena Water and Power Dept	328	329	332	334	335	337	338	339	340	342	342	342	0.4%
San Diego Gas & Electric	4,447	4,905	4,983	5,058	5,131	5,197	5,266	5,332	5,399	5,466	5,533	5,599	1.3%
SDG&E Bundled Customers	3,897	4,306	4,384	4,460	4,532	4,599	4,667	4,734	4,800	4,868	4,935	5,001	1.5%
SDG&E Direct Access	550	599	599	599	599	599	599	599	599	599	599	599	0.0%
Dept of Water Resources - South	463	463	463	463	463	463	463	463	463	463	463	463	0.0%
<b>Total South of Path 15</b>	<b>28,645</b>	<b>30,301</b>	<b>30,744</b>	<b>31,177</b>	<b>31,582</b>	<b>31,980</b>	<b>32,369</b>	<b>32,752</b>	<b>33,119</b>	<b>33,500</b>	<b>33,863</b>	<b>34,217</b>	<b>1.2%</b>
<b>Turlock Irrigation District Control Area</b>	<b>2,892</b>	<b>2,935</b>	<b>2,979</b>	<b>3,018</b>	<b>3,061</b>	<b>3,097</b>	<b>3,133</b>	<b>3,165</b>	<b>3,199</b>	<b>3,231</b>	<b>3,261</b>	<b>3,296</b>	<b>1.2%</b>
Sacramento Municipal Utilities District	3,436	3,523	3,613	3,704	3,802	3,903	4,004	4,105	4,205	4,298	4,390	4,503	2.5%
WAPA	219	219	219	219	219	219	219	219	219	219	219	219	0.0%
Redding	256	260	263	266	270	274	277	281	284	288	291	296	1.3%
Roseville	348	352	357	362	367	372	377	381	386	391	396	401	1.3%
Shasta	31	32	32	33	33	34	34	34	35	35	36	36	1.3%
Modesto Irrigation District	696	706	715	724	735	744	754	763	773	783	792	804	1.3%
<b>Total SMUD/WAPA Control Area</b>	<b>4,987</b>	<b>5,091</b>	<b>5,199</b>	<b>5,307</b>	<b>5,426</b>	<b>5,545</b>	<b>5,665</b>	<b>5,783</b>	<b>5,902</b>	<b>6,014</b>	<b>6,124</b>	<b>6,259</b>	
Los Angeles Department of Water and P	5,834	5,872	5,907	5,936	5,961	5,983	6,005	6,024	6,044	6,063	6,083	6,132	0.4%
Burbank Public Service Dept	294	296	297	298	300	300	301	301	302	302	303	297	0.0%
Glendale Public Service Dept	310	312	314	315	316	317	317	318	319	319	320	313	0.0%
<b>Total LADWP Control Area</b>	<b>6,438</b>	<b>6,480</b>	<b>6,518</b>	<b>6,549</b>	<b>6,576</b>	<b>6,600</b>	<b>6,624</b>	<b>6,643</b>	<b>6,665</b>	<b>6,684</b>	<b>6,706</b>	<b>6,743</b>	
<b>Imperial Irrigation District Control Area</b>	<b>917</b>	<b>935</b>	<b>951</b>	<b>967</b>	<b>983</b>	<b>1,000</b>	<b>1,017</b>	<b>1,034</b>	<b>1,052</b>	<b>1,070</b>	<b>1,088</b>	<b>1,109</b>	<b>1.7%</b>
<b>Total CAISO</b>	<b>50,798</b>	<b>52,745</b>	<b>53,491</b>	<b>54,210</b>	<b>54,942</b>	<b>55,646</b>	<b>56,343</b>	<b>57,019</b>	<b>57,693</b>	<b>58,378</b>	<b>59,039</b>	<b>59,767</b>	#DIV/0!
<b>Total State</b>	<b>66,032</b>	<b>68,185</b>	<b>69,139</b>	<b>70,051</b>	<b>70,988</b>	<b>71,887</b>	<b>72,782</b>	<b>73,645</b>	<b>74,511</b>	<b>75,376</b>	<b>76,216</b>	<b>77,174</b>	#REF!
<b>Total CAISO Coincident Demand</b>	<b>49,582</b>	<b>51,482</b>	<b>52,210</b>	<b>52,912</b>	<b>53,626</b>	<b>54,313</b>	<b>54,994</b>	<b>55,653</b>	<b>56,311</b>	<b>56,980</b>	<b>57,625</b>	<b>58,336</b>	#REF!
<b>Total Statewide Coincident Demand</b>	<b>64,451</b>	<b>66,553</b>	<b>67,483</b>	<b>68,374</b>	<b>69,288</b>	<b>70,166</b>	<b>71,039</b>	<b>71,881</b>	<b>72,726</b>	<b>73,571</b>	<b>74,391</b>	<b>75,326</b>	#REF!

**Form 1.7a - Statewide  
California Energy Demand 2008-2018 Staff Draft Forecast  
Private Supply by Sector (GWh)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	TCU	Streetlighting	Total Consumption
1980	0	26	948	0	0	0	0	974
1981	0	26	967	0	0	3	0	996
1982	0	42	1,126	46	0	103	0	1,317
1983	0	150	1,836	107	4	118	0	2,215
1984	0	204	1,941	239	4	165	0	2,552
1985	1	311	2,110	297	7	247	0	2,973
1986	2	382	2,656	587	8	354	0	3,990
1987	4	573	3,793	829	11	454	0	5,664
1988	5	882	5,571	965	17	522	0	7,962
1989	6	938	5,917	1,297	18	557	0	8,733
1990	7	1,058	6,012	1,432	18	605	0	9,132
1991	7	1,101	5,927	1,521	19	612	0	9,186
1992	6	1,128	5,876	1,508	20	590	0	9,128
1993	7	1,189	6,842	1,436	16	666	0	10,156
1994	0	1,420	7,088	1,434	15	671	0	10,629
1995	0	1,476	7,157	1,430	16	703	0	10,781
1996	0	1,418	7,746	1,463	15	563	0	11,206
1997	0	1,462	7,825	1,532	15	571	0	11,406
1998	0	1,497	7,585	1,562	14	511	0	11,170
1999	0	1,529	7,705	1,475	0	493	0	11,201
2000	0	1,519	7,339	1,467	0	498	0	10,824
2001	0	609	6,754	2,070	0	465	0	9,899
2002	0	871	8,048	2,295	0	420	0	11,633
2003	0	907	8,454	2,419	0	445	0	12,225
2004	0	873	7,312	2,416	0	404	0	11,006
2005	0	931	7,251	2,335	0	379	0	10,896
2006	4	1,062	8,342	2,384	0	390	0	12,182
2007	8	1,222	8,484	2,426	0	402	0	12,543
2008	13	1,461	8,767	2,514	0	512	0	13,267
2009	19	1,855	9,600	2,617	4	536	0	14,630
2010	26	2,258	9,828	2,792	4	591	0	15,499
2011	35	2,781	10,121	2,891	7	682	0	16,517
2012	45	3,306	10,741	3,209	8	795	0	18,105
2013	57	4,013	11,954	3,479	11	899	0	20,413
2014	68	4,898	13,797	3,639	17	972	0	23,392
2015	81	5,598	14,215	3,997	18	1,012	0	24,921
2016	94	6,424	14,377	4,157	18	1,064	0	26,133
2017	108	7,235	14,356	4,269	19	1,075	0	27,061
2018	121	8,122	14,402	4,290	20	1,060	0	28,016

**Annual Growth Rates (%)**

1980-1990		44.9	20.3				25.1
1990-2000		3.7	2.0	0.2		-1.9	1.7
2000-2005		23.0	14.1	29.7	16.1	18.9	16.4
2005-2008		21.4	13.8	19.6	15.9	15.1	15.3
2008-2018	24.6	16.8	13.0	17.0	8.7	11.0	13.8
2005-2018		14.0	11.3	9.6	6.3	4.7	10.9



**Form 2.2 - Statewide**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Planning Area Economic and Demographic Assumptions**

Year	Population	Households	Persons per Household	Real Personal Income (Millions 2005\$)	Industrial Value Added (Millions 2005\$)
1980	23,026,354	8,603,579	2.68	214,173	12,902
1981	23,283,973	8,687,725	2.68	219,336	13,204
1982	23,616,745	8,750,158	2.70	220,301	12,795
1983	24,337,402	8,900,661	2.73	230,033	12,953
1984	25,102,335	9,102,067	2.76	251,153	13,620
1985	25,877,337	9,350,739	2.77	265,678	13,994
1986	26,684,262	9,624,574	2.77	278,666	14,184
1987	27,279,125	9,836,740	2.77	289,207	14,790
1988	27,855,886	10,055,936	2.77	300,260	15,557
1989	28,486,493	10,255,606	2.78	309,123	16,123
1990	28,910,125	10,370,841	2.79	315,582	16,469
1991	29,521,345	10,543,382	2.80	312,532	15,937
1992	30,046,894	10,666,837	2.82	319,693	15,878
1993	30,367,065	10,769,576	2.82	317,763	15,868
1994	30,569,764	10,864,740	2.81	321,110	15,791
1995	30,752,195	10,956,693	2.81	329,214	16,659
1996	30,989,838	11,045,744	2.81	340,184	16,411
1997	31,469,489	11,139,533	2.83	355,532	17,471
1998	31,874,001	11,244,898	2.83	382,494	17,603
1999	32,423,478	11,365,581	2.85	402,436	17,030
2000	33,017,929	11,456,150	2.88	435,463	17,401
2001	33,759,790	11,589,188	2.91	441,814	15,249
2002	34,374,833	11,725,228	2.93	442,761	14,711
2003	34,942,477	11,868,183	2.94	449,950	14,289
2004	35,451,683	12,026,473	2.95	470,043	15,022
2005	35,905,478	12,201,640	2.94	483,758	15,308
2006	36,361,004	12,339,699	2.95	503,045	15,553
2007	36,816,603	12,477,355	2.95	522,140	15,731
2008	37,272,187	12,614,567	2.95	541,225	16,000
2009	37,727,766	12,751,360	2.96	560,528	16,215
2010	38,183,145	12,887,642	2.96	578,602	16,364
2011	38,639,038	13,023,257	2.97	595,919	16,562
2012	39,094,923	13,158,454	2.97	611,984	16,660
2013	39,550,801	13,293,227	2.98	627,025	16,794
2014	40,006,667	13,427,583	2.98	641,922	16,837
2015	40,462,520	13,561,527	2.98	656,697	16,930
2016	40,918,348	13,695,043	2.99	671,244	16,996
2017	41,374,156	13,828,151	2.99	685,563	17,050
2018	41,829,959	13,960,840	3.00	699,852	17,056

**Annual Growth Rates (%)**

1980-1990	2.3	1.9	0.4	4.0	2.5
1990-2000	1.3	1.0	0.3	3.3	0.6
2000-2005	1.7	1.3	0.4	2.1	-2.5
2005-2008	1.3	1.1	0.1	3.8	1.5
2008-2018	1.2	1.0	0.1	2.6	0.6
2005-2018	1.2	1.0	0.1	2.9	0.8

## **CHAPTER 2: PACIFIC GAS AND ELECTRIC PLANNING AREA**

The Pacific Gas and Electric (PG&E) planning area includes (1) PG&E bundled retail customers, (2) customers served by energy service providers (ESPs) using the PG&E distribution system to deliver electricity to end users, and (3) customers of publicly owned utility and irrigation districts in PG&E's transmission system, with the notable exception of the Sacramento Municipal Utility District (SMUD).<sup>1</sup> SMUD is treated as its own planning area and is discussed in a later chapter.

For purposes of this chapter, the PG&E planning area forecast includes the members of the SMUD control area, Roseville, Redding, and the Western Area Power Administration (WAPA). To support electricity and transmission system analysis, staff uses historic consumption and load data to develop individual forecasts for all medium and large utilities in the planning area. Those results are presented in Form 1.5a through 1.5c following Chapter 1. The results in this chapter are for the entire PG&E transmission planning area.

This chapter is organized as follows. First, forecasted consumption and peak loads for the PG&E planning area are discussed; both total and per capita values are presented. The draft CED 2008 values are compared to the adopted CED 2006 forecast, with differences between the two forecasts explained. The forecasted load factor, jointly determined by the consumption and peak load estimates, is also discussed. Second, the chapter presents sector consumption and peak load forecasts. The residential, commercial, industrial, and "other" sector forecasts are compared to those in CED 2006 and, again, differences between the two discussed. Third, the chapter discusses the forecasts for the SGIP and CSI programs.

### **Planning Area Results**

Table 2-1 presents a comparison of the draft CED 2008 and CED 2006 electricity consumption and peak demand forecasts for selected years.

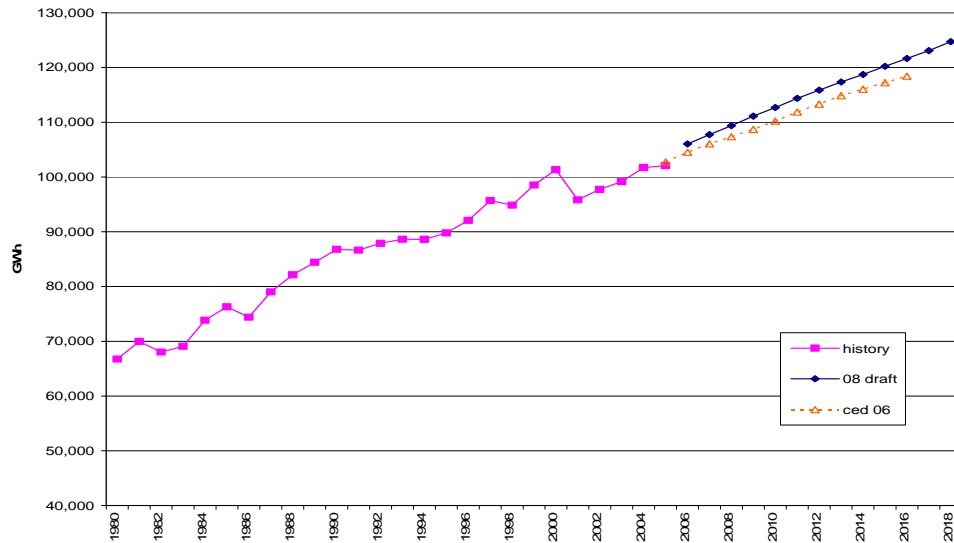
In the PG&E planning area, the major difference between consumption forecasts is in the estimate of short-term growth to 2008. The post-2008 growth rates of the two forecasts are very similar. The peak forecast differences are mainly due to the starting values of each forecast. Staff has increased its projection of 2007 and 2008 peak forecasts from the original projections made in 2005 based on actual temperatures and weather normalized load growth. The revised projections were vetted in public workshops and were adopted by the Energy Commission in June of 2006 and 2007 for use in the CPUC Resource Adequacy process. The recently adopted 2008 peak is used as the starting point of the draft CED 2008 peak forecast. The 2008-2016 growth rate of the draft 2008 peak forecast is slightly lower than the adopted CED 2006 forecast, but differences in the 2008 starting value impact future year projections.

**Table 2-1: PG&E Planning Area Forecast Comparison**

Consumption (GWH)				Peak (MW)		
	CED 2006	Staff Draft	Percent Difference Staff Draft/CED 2006	CED 2006	Staff Draft	Percent Difference Staff Draft/CED 2006
1990	86,806	86,803	0.00%	17,039	17,013	-0.15%
2000	101,528	101,334	-0.19%	20,698	20,666	-0.16%
2005	102,746	102,070	-0.66%	21,162	21,354	0.90%
2008	107,366	108,918	1.45%	22,142	23,424	5.79%
2013	114,863	116,668	1.57%	23,761	25,032	5.35%
2016	118,390	120,942	2.16%	24,600	25,981	5.61%
Annual Average Growth Rates						
1990-2000	1.58%	1.56%		1.96%	1.96%	
2000-2005	0.24%	0.14%		0.44%	0.66%	
2005-2008	1.48%	2.19%		1.52%	3.13%	
2008-2016	1.23%	1.32%		1.32%	1.30%	
Historic values are shaded						

As shown in Figure 2-1, the draft CED 2008 electricity consumption forecast for the PG&E planning area is higher in the very near term than the adopted CED 2006 forecast. This result is attributed to increases in the residential and commercial sector forecasts. The residential increase is caused by higher short-term income growth expectations. Staff is currently in the process of re-examining the implicit wealth impact on residential consumption. The increase in commercial consumption is due to a change in methodology in estimating commercial floor space which resulted in an increase in the projection of commercial square footage. Aside from the short-term forecast difference, the medium- and long-term growth of both forecasts is relatively similar.

**Figure 2-1: PG&E Planning Area Electricity Forecast**



The draft CED 2008 PG&E planning area peak demand forecast, shown in Figure 2-2, is higher over the entire forecast period compared to the CED 2006 forecast. This increase is due to the annual updates of the peak forecast described earlier in this chapter as well as the increased consumption forecast.

**Figure 2-2: PG&E Planning Area Peak**

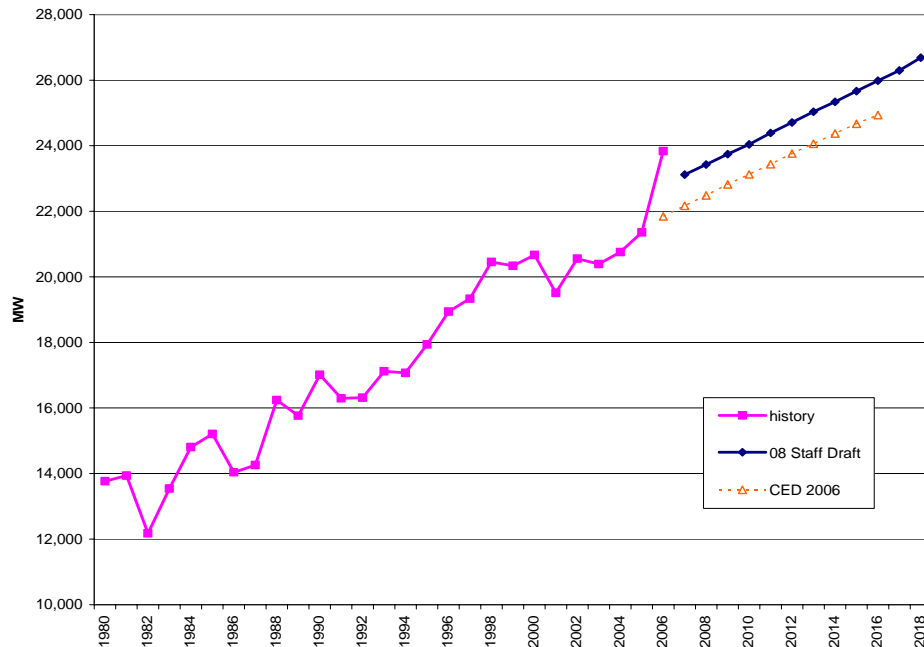
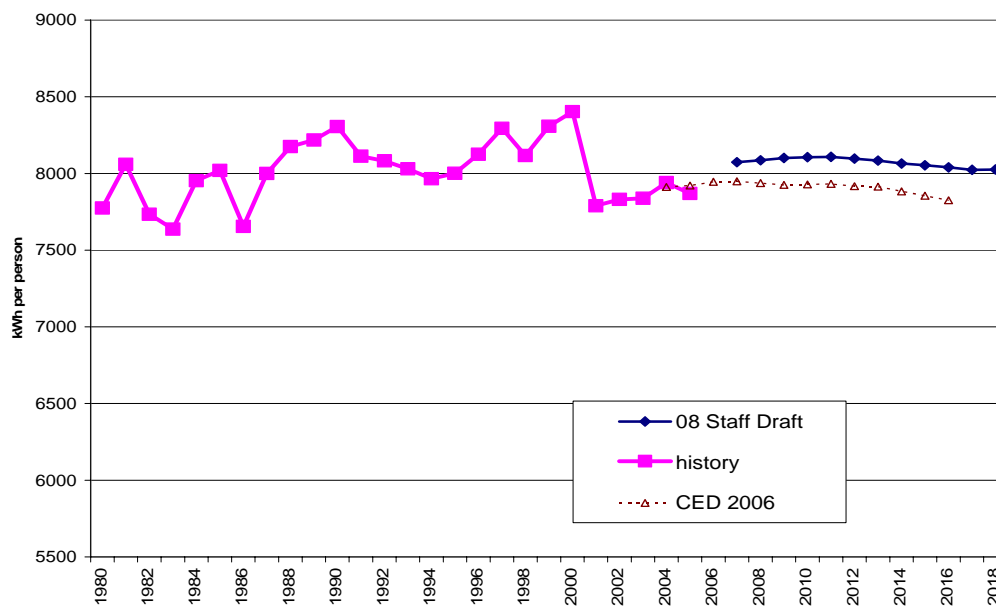


Figure 2-3 provides comparisons of PG&E planning area per capita electricity consumption between the draft CED 2008 and CED 2006 forecasts. As in the consumption forecasts, the difference in per capita consumption is in the assumed near-term level. Both forecasts are relatively flat over the forecast period. Evaluation of the 2006 Quarterly Fuel and Reporting (QFER) data may help provide some insight into the 2006 difference. The level of per capita consumption projected in the draft CED 2008 forecast is still projected to be below pre-energy crisis consumption levels.

**Figure 2-3: PG&E Planning Area Per Capita Electricity Consumption**



After an adjustment up in 2007 for calibration and weather adjustment, the draft CED 2008 per capita peak demand, shown in Figure 2-4, remains relatively constant throughout the forecast period. This level is somewhat higher than the CED 2006 level due to a full rebound from the energy crisis. The CED 2008 projected level of per capita peak now estimated to be at a level similar to the mid- to late-1990s, prior to the energy crisis.

**Figure 2-4: PG&E Planning Area per Capita Peak Demand**

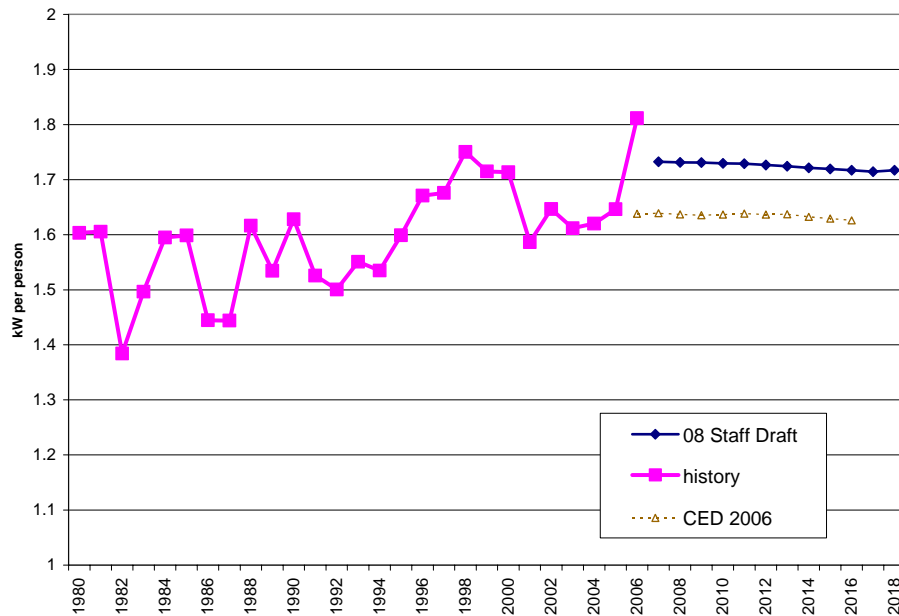
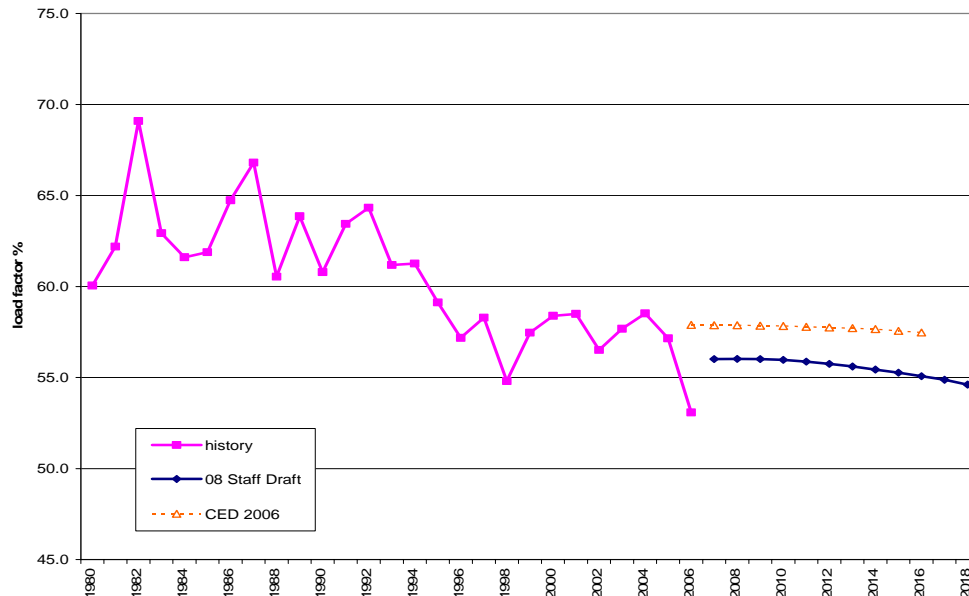


Figure 2-5 provides a comparison of the respective implied forecast load factors. The load factor is a measure of the increase in peak demand relative to annual electricity consumption. Lower load factors indicate “a needle peak;” higher load factors indicate a more stable load. Actual data show a long-term downward trend as consumption shifts away from the industrial sector toward residential and commercial use. Further, more population and economic growth in the PG&E planning area is taking place in hotter inland areas, leading to greater saturation of central air conditioning and to a greater use of air conditioning equipment in the cooler Bay Area on the peak day compared to previous historic years. The CED 2008 projected load factor is on the low end of the range of annual load factors of recent history. Over the longer forecast period, the draft CED 2008 load factor declines slightly, which is consistent with higher weather-sensitive load growth in relation to baseload energy growth.

**Figure 2-5: PG&E Planning Area Load Factor**



## Sector Level Results and Input Assumptions

### *Residential Sector*

Figure 2-6 provides a comparison between the draft CED 2008 and CED 2006 PG&E planning area residential forecasts. The draft CED 2008 forecast is higher throughout the entire forecast period mainly because of a higher 2006 starting point. The higher starting point results from the higher short-term growth in household income used in the draft CED 2008 forecast and short-term calibration. Staff is currently in the process of examining the 2006 QFER data, which have been recently received from the various LSEs within the PG&E planning area, in order to determine the most accurate starting point. The forecasted growth rate from 2008-2016 is very similar for both forecasts.

**Figure 2-6: PG&E Planning Area Residential Consumption**

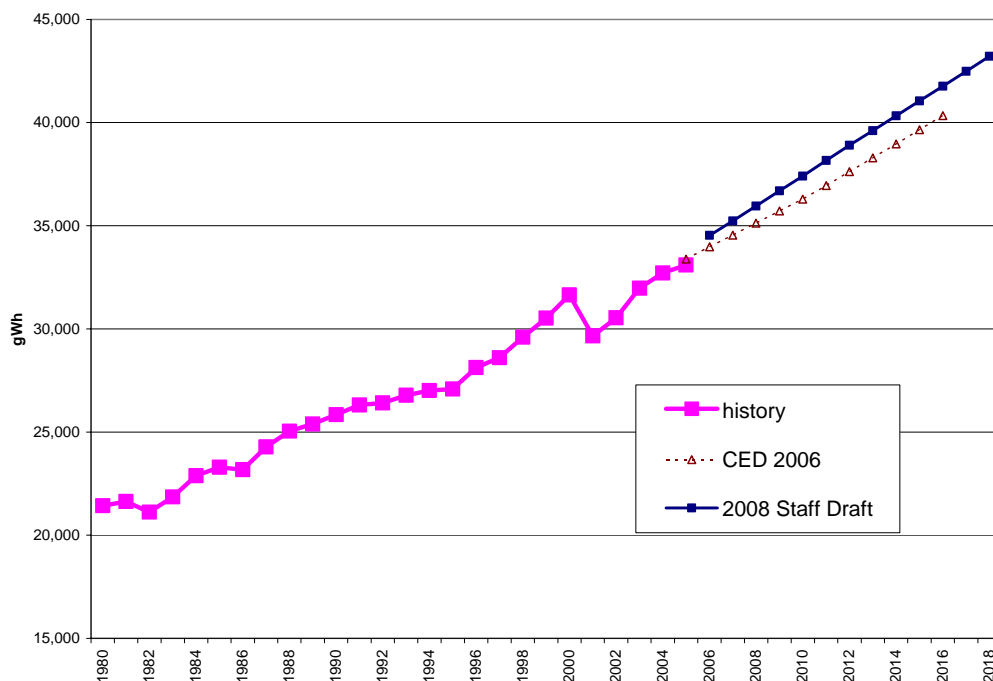
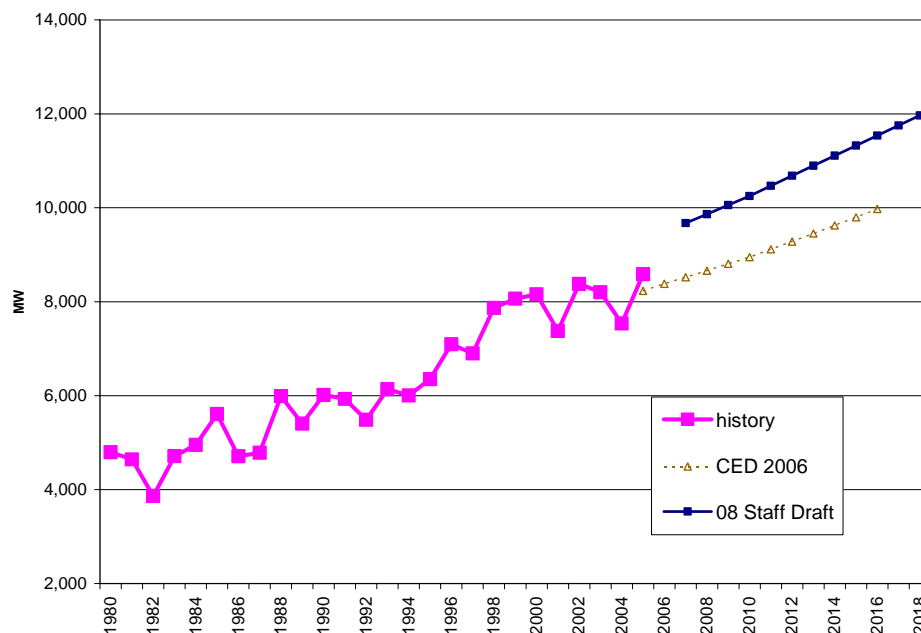




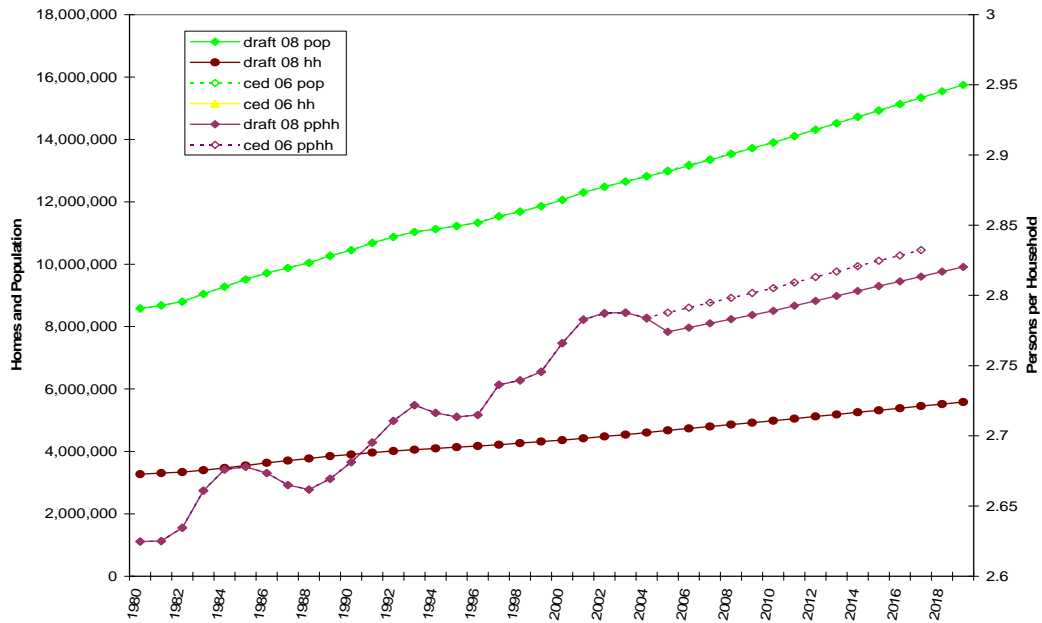
Figure 2-7 provides a comparison of the CED 2008 and CED 2006 residential peak demand forecasts. As in the electricity consumption forecast, the draft CED 2008 residential peak forecast is higher than that for CED 2006. The difference between the two peak forecasts is greater than the difference in the electricity consumption forecasts because the savings from 2005 federal air conditioner standards are assumed to have a greater impact on annual electricity consumption than on peak. Also contributing to the difference is the inclusion of the increases in peak forecasts that were made in June of 2006 and 2007. The yearly updates were made at the systemwide level and not transferred to the sector level.

**Figure 2-7: PG&E Planning Area Residential Peak**

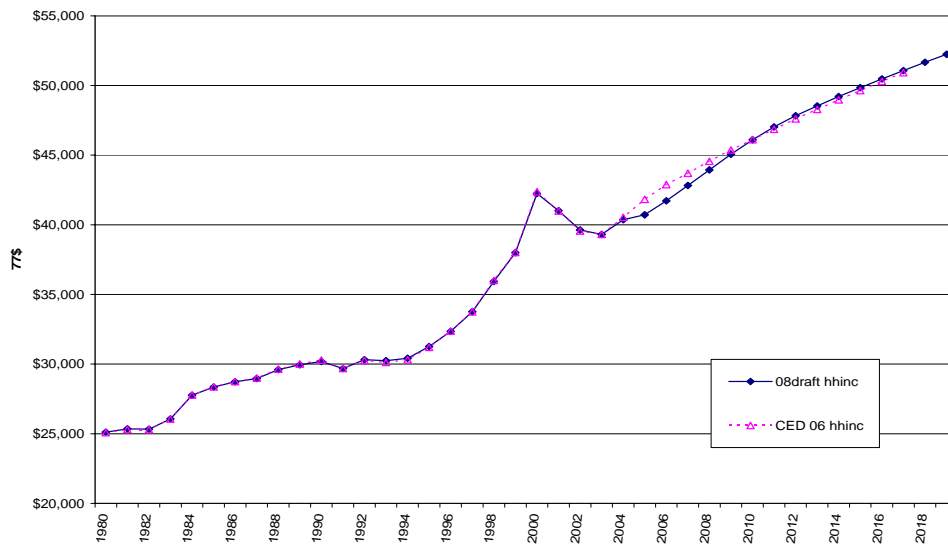


Figures 2-8 and 2-9 provide comparisons of the residential drivers used in the draft CED 2008 forecast with those used previously. Figure 2-8 provides comparisons of the total population, total households, and persons per household projections. The draft CED 2008 forecast of total population and households is virtually the same as the previous forecast. There is a slight difference, given the inclusion of 2005 historic population and household estimates at the county level. This served to lower the projection of persons per household slightly. The California Department of Finance is scheduled to release a new long-term population forecast later this summer, and staff hopes to incorporate this new forecast into the final CED 2008 forecast. Figure 2-9 provides a comparison of household income (per capita income multiplied by persons per household) between the two forecasts. The draft CED 2008 estimate of 2005 household income is lower than that projected in the CED 2006 forecast. However, the projected short-term growth in household income to 2010 is higher in the draft CED 2008 forecast. After 2010, the growth rates of both forecasts are similar.

**Figure 2-8: PG&E Planning Area Residential Demographic Projections**



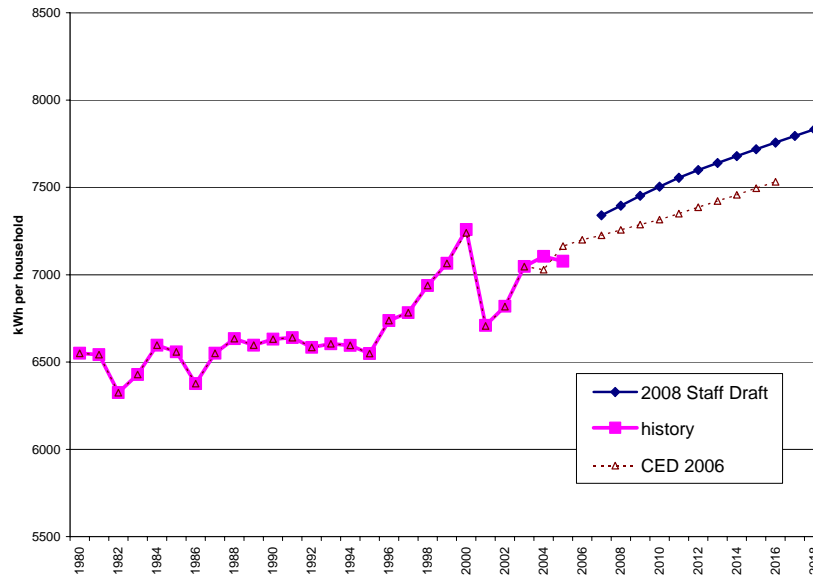
**Figure 2-9: PG&E Planning Area Household Income Projections**



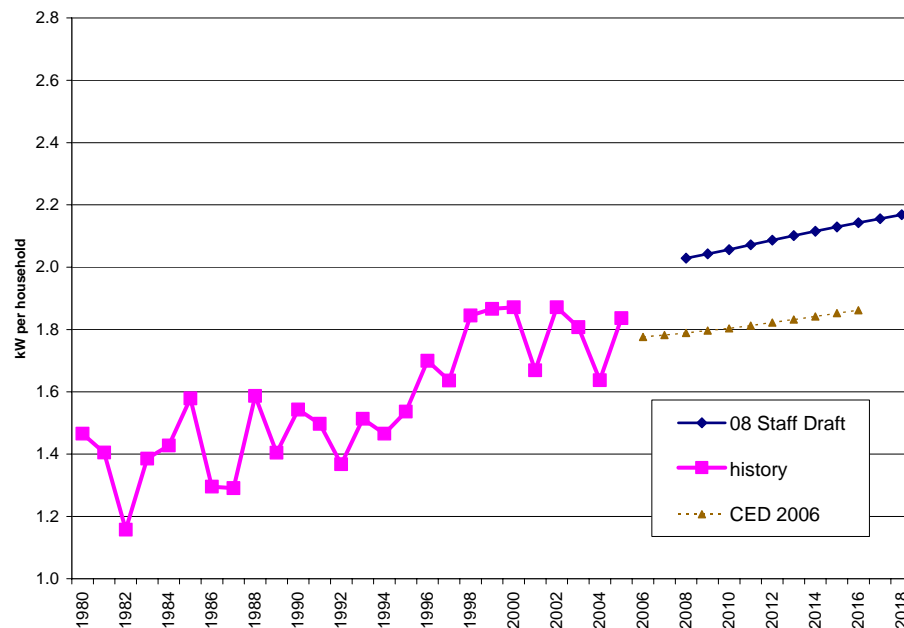
Figures 2-10 and 2-11 represent a comparison of electricity use per household between the two forecasts. Figure 2-10 is a comparison of annual use per household, and Figure 2-11 presents a comparison of peak use per household. The draft CED 2008 forecast for both annual energy and peak demand is somewhat

higher than that projected in CED 2006, primarily due to the higher estimated starting value (2008). Staff is currently in the process of analyzing recently submitted 2006 QFER forms to determine the most accurate starting point. The forecasted growth rate of the draft CED 2008 forecast is slightly higher for both energy and peak.

**Figure 2-10: PG&E Planning Area Use per Household**



**Figure 2-11: PG&E Planning Area Peak Use per Household**

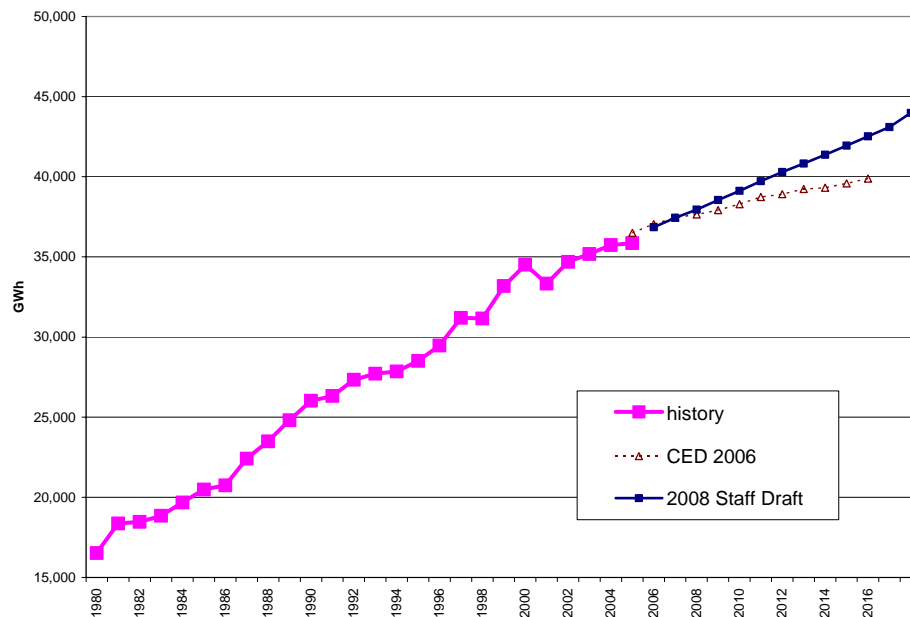


## Commercial Building Sector

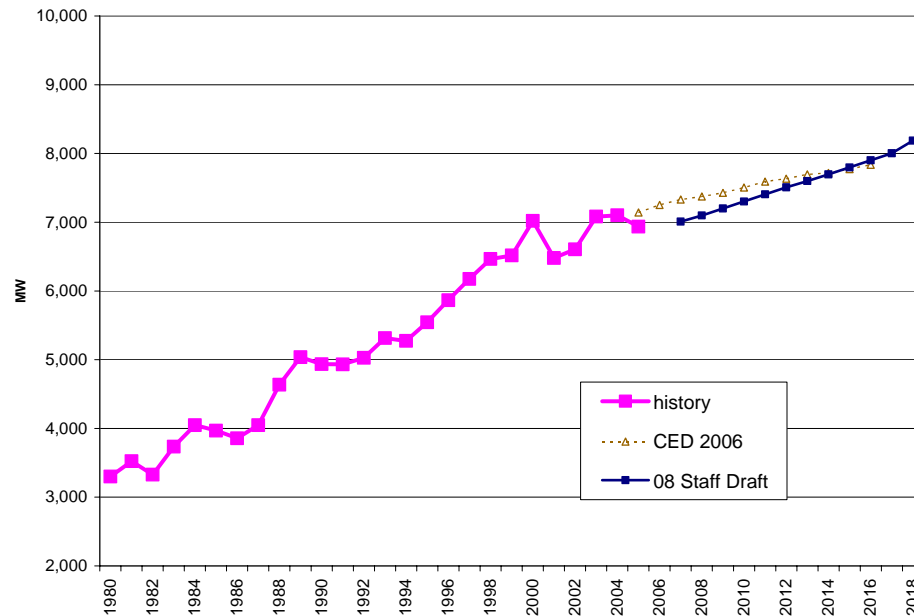
Figure 2-12 provides a comparison of the commercial building sector forecasts. The draft CED 2008 forecast is higher throughout the entire forecast period. This is primarily caused by an increase in commercial floor space projections. The increase in floor space projections is a result of the new floor space estimates described in Chapter 1 of this report.

Figure 2-13 provides a comparison of the commercial peak demand forecasts. Growth in both forecasts is driven primarily by the underlying electricity consumption forecast and exhibits the same pattern.

**Figure 2-12: PG&E Planning Area Commercial Consumption**

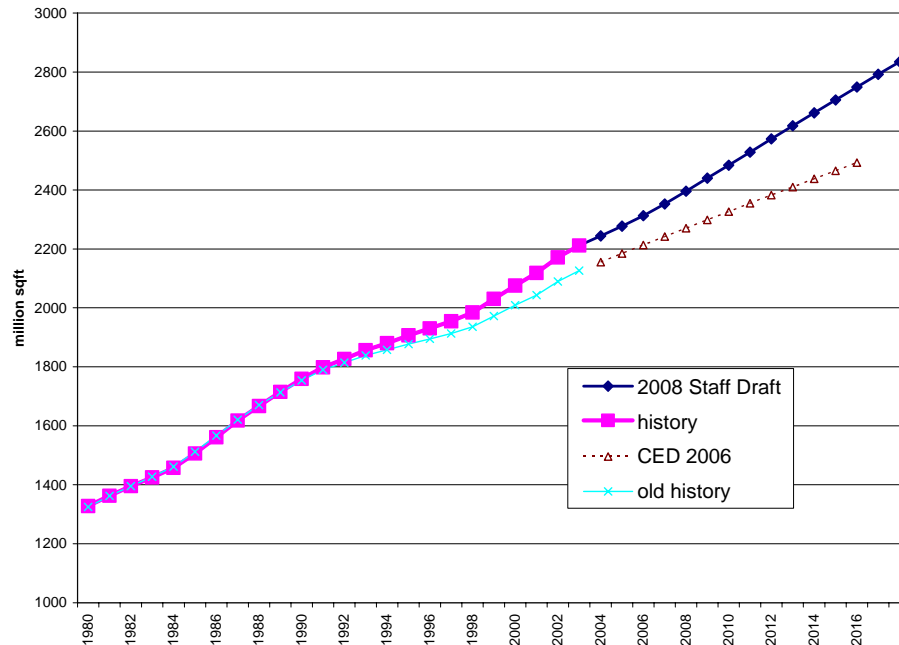


**Figure 2-13: PG&E Planning Area Commercial Sector Peak**



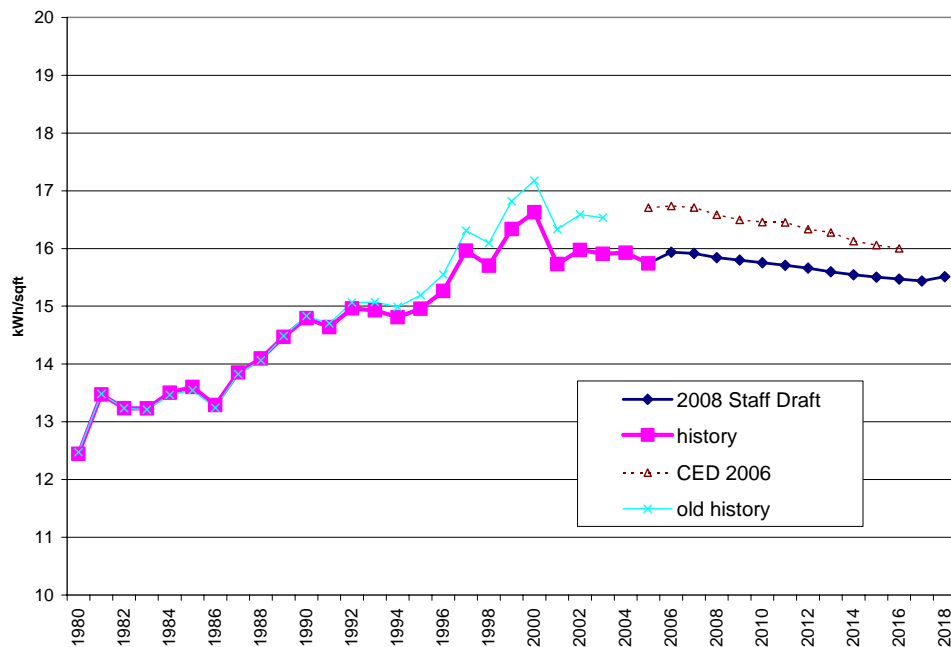
In staff's commercial building sector forecasting model, floor space by building type, such as retail, offices, and schools, is the key driver. Figure 2-14 provides a comparison of total commercial floor space projections and historic estimates used in the two forecasts. Both history and forecast values for the draft CED 2008 forecast are higher than the projections used in the CED 2006 forecast. The post-1990 historic floor space estimates have been re-estimated based on increased building lifetime assumptions. The draft CED 2008 floor space projections were estimated using econometric analysis and projected economic and demographic variables rather than the historic average method used in the CED 2006 forecast. Staff is in the process of analyzing historic floor space stock estimates by county, which were purchased to use as a check on our estimation procedures.

**Figure 2-14: PG&E Planning Area Commercial Floor space**

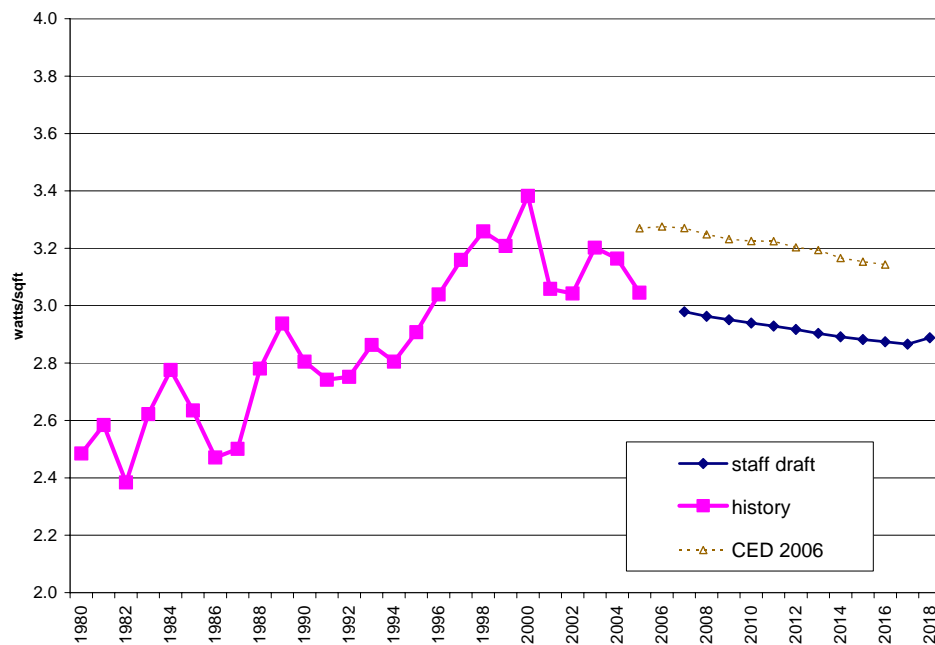


Historic and projected commercial sector annual and peak use per square foot are shown in Figures 2-15 and 2-16, respectively. Changes in annual use per square foot are based on changes in historic floor space estimates and are also presented in Figure 2-15. Historic floor space estimates are lower because of the changes in the decay rate used to estimate remaining stock, as discussed in Chapter 1. The draft CED 2008 annual use per square foot declines over the forecast period at a slightly lower rate than the CED 2006 forecast, as does commercial peak use (Figure 2-16). The lower starting values, in both instances, are due to revised estimates of historic use. Both the energy and peak forecasts decline over the forecast period due to projected impacts of commercial building and appliance standards.

**Figure 2-15: PG&E Planning Area Commercial kWh per Square Foot**



**Figure 2-16: PG&E Planning Area Commercial Sector Peak Watts per Square Foot**



## Industrial Sector

Figure 2-17 provides comparisons of the PG&E planning area industrial sector electricity consumption forecasts. The draft CED 2008 industrial consumption forecast is higher in the short term than the CED 2006 forecast due to a higher 2005 starting point. However, the projected growth in the draft CED 2008 forecast is lower than was projected in the CED 2006 forecast. The net result is a somewhat lower draft CED 2008 forecast after 2010. This is caused by lower forecasted industrial economic drivers used in the draft CED 2008 forecast and constant electricity rates. The higher starting point of the draft CED 2008 forecast is, in part, a result of distributing previously unclassified consumption into the industrial sector based on revised QFER filings by various utilities.

**Figure 2-17: PG&E Planning Area Industrial Consumption**

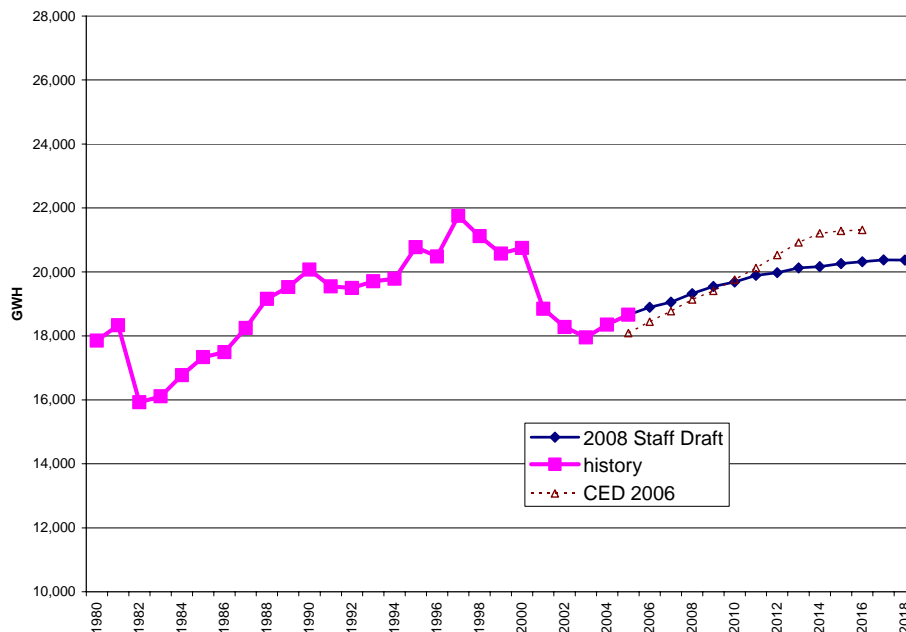


Figure 2-18 provides a comparison of the industrial sector peak forecasts. The draft CED 2008 peak is higher due to an increase in the starting point value, although the new forecast is flatter than the previous one. This follows a similar pattern to the consumption forecast.



**Figure 2-18: PG&E Planning Area Industrial Sector Peak**

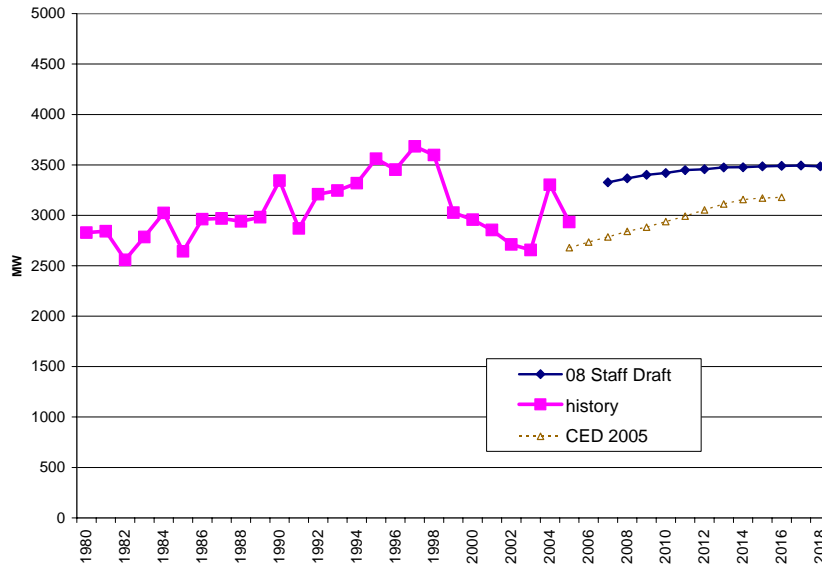
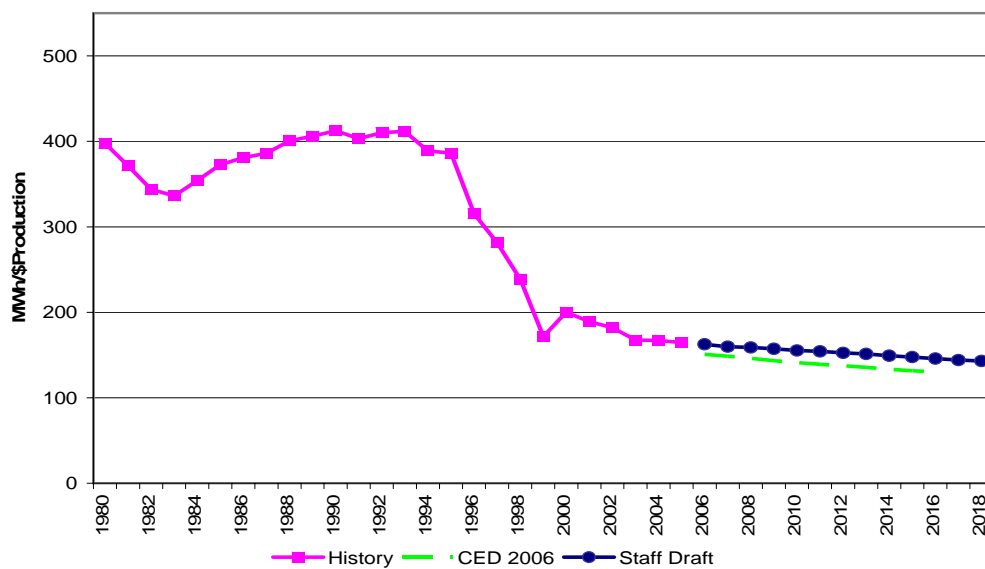


Figure 2-19 provides a comparison of electricity use per dollar of industrial production value between the draft CED 2008 and CED 2006 forecasts. The draft CED 2008 forecast is slightly higher than the CED 2006 forecast due to a slightly higher starting value. Both forecasts decline slightly over the forecast period. This is a continuation of the recent historic trend, which is in contrast to the rapid decline seen in the 1994-2000 period.

**Figure 2-19: PG&E Planning Area Industrial Sector Use per Production Unit**



## Other Sectors

Figure 2-20 provides a comparison of the electricity consumption forecasts for the transportation, communication, and utilities and streetlighting sectors. The draft CED 2008 transportation, communication, and utilities and streetlighting forecast is higher than the CED 2006 forecast given the higher starting point. The higher starting point is a result of assigning previously unclassified consumption to this sector based on more recent QFER filings. The growth rates of the two forecasts are very similar.

**Figure 2-20: PG&E Planning Transportation, Communication, and Utilities and Streetlighting Sector Electricity Forecasts**

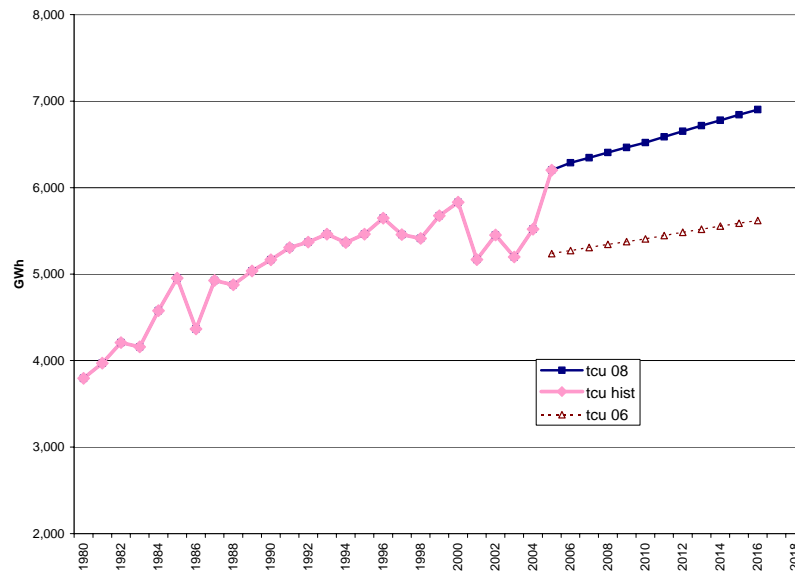


Figure 2-21 provides a comparison of the electricity consumption forecasts for the agriculture and water pumping and mining and oil extraction sectors. The draft CED 2008 agriculture and water pumping forecast is lower than CED 2006 forecast due to a decrease in the recent history of surface water pumping. This lower level of surface water pumping is expected to continue. The draft CED 2008 mining and oil extraction sector forecast is higher than the CED 2006 forecast based on a slightly higher starting point. The higher starting point is, in part, due to the reassignment of unclassified historic consumption into this sector. The draft CED 2008 forecast is projected to remain fairly constant because of constraints on future capacity expansion.

**Figure 2-21: PG&E Planning Area Other Sector Electricity Forecasts (Agriculture & Water Pumping, Mining & Oil Extraction)**

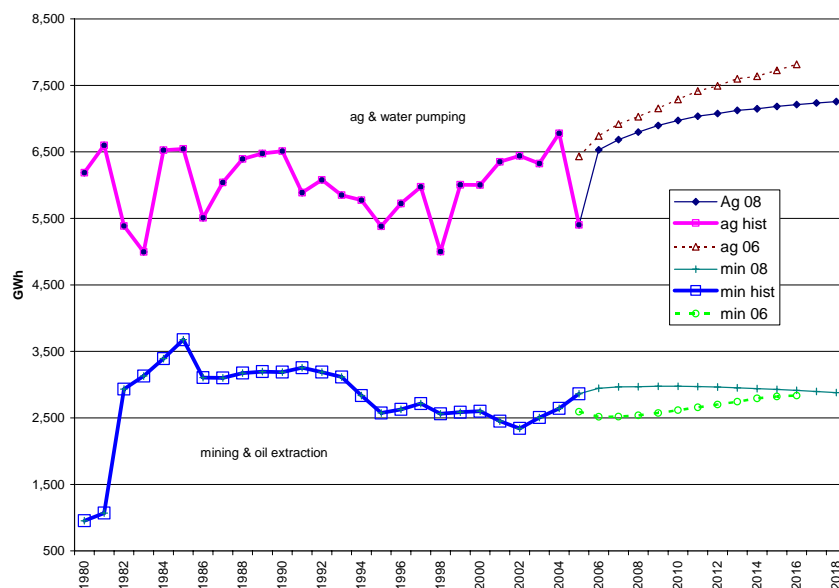
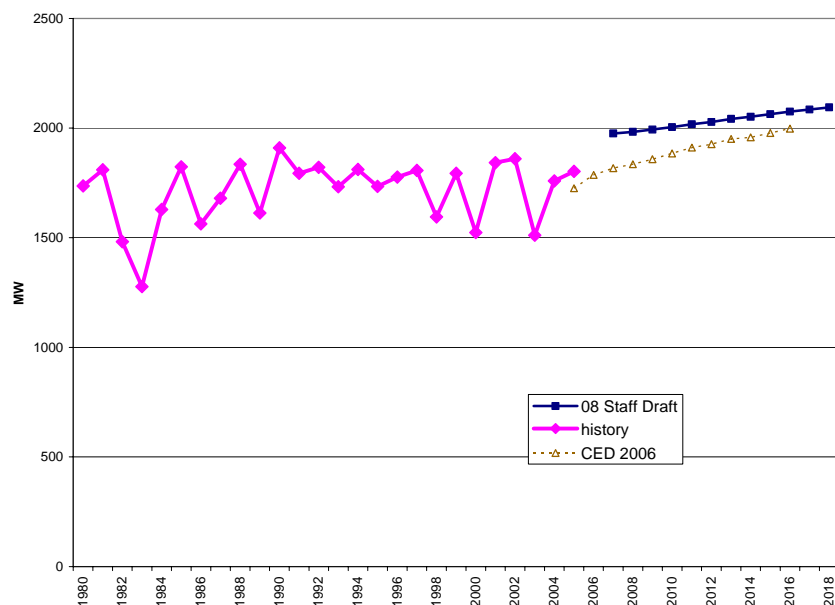


Figure 2-22 provides a comparison between the two forecasts of the combined peak for these sectors. The draft CED 2008 forecast is higher over the entire forecast period than the CED 2006 due to a higher assumed starting point. However, the growth rate of the draft CED 2008 forecast is lower than that of the CED 2006 forecast given the lower assumed growth in the agriculture and mining and oil extraction sectors.

**Figure 2-22: PG&E Planning Area Other Sector Peak**



## Electricity Prices

Pending the results of the forthcoming electricity price workshop, the draft CED 2008 forecast used prices which are held constant (in real terms) at the 2005 level for all sectors. This is in contrast to the declining price forecast which was used in the CED 2006 price forecast.

## Self-Generation

As discussed in Chapter 1, the peak demand forecast is reduced by the projected effects of the SGIP and CSI programs. Both programs are forecast based on recent trends in installations. Figure 2-23 shows the staff forecast of cumulative and incremental installations and the incremental installations projected by PG&E. The staff forecast is slightly lower than the PG&E forecast.

**Figure 2-23: PG&E Planning Area SGIP Peak Forecasts**

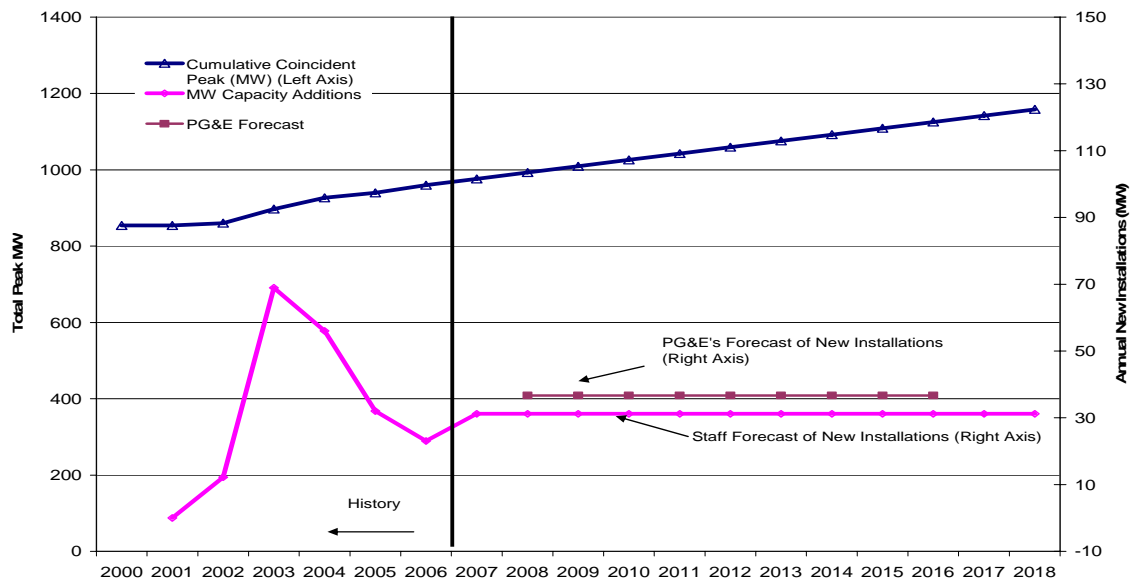
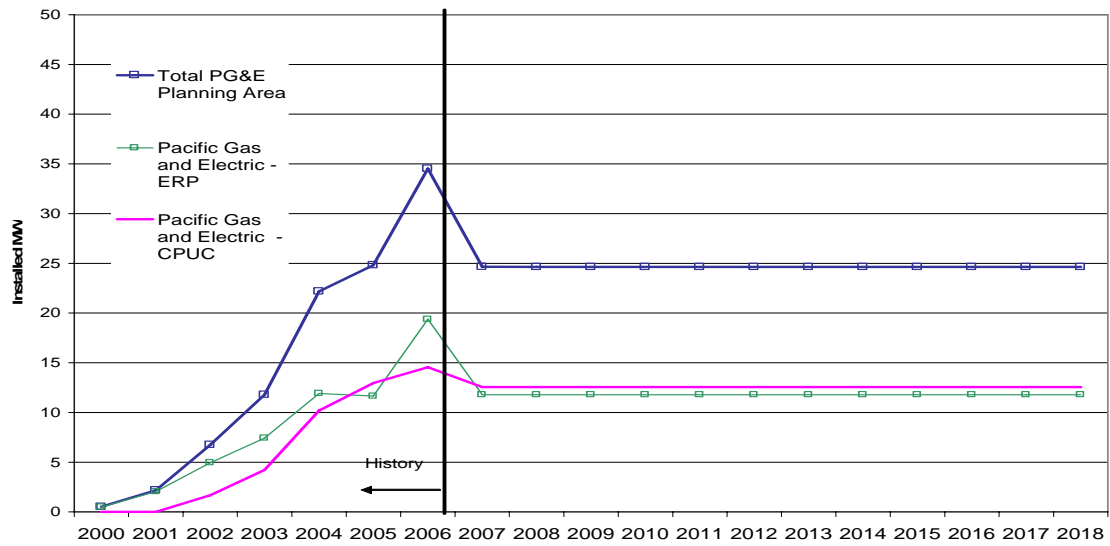


Figure 2-24 shows the incremental installed capacity in recent years for the Energy Commission and CPUC programs individually and the staff's total forecast for both programs. The three-year average used by staff to project future additions may prove to be conservative; 2006 saw a sharp increase in activity. However, as can be seen from the Figure 2-23 on the SGIP program, we might also expect to see a leveling off of growth as the program matures.

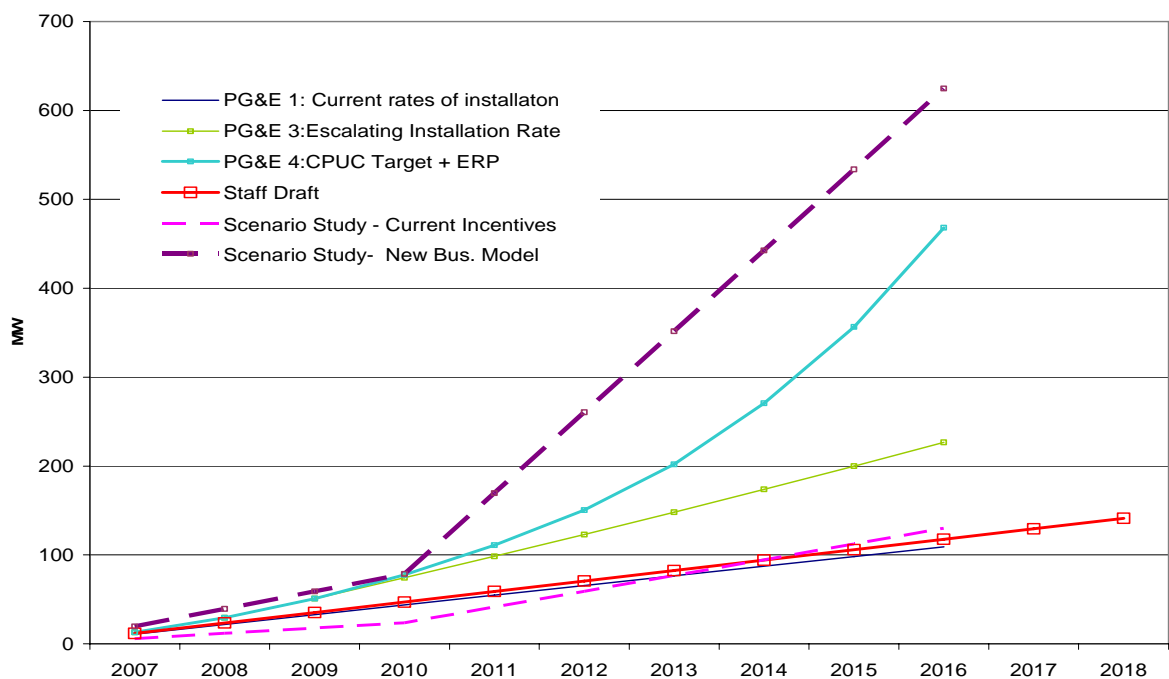
**Figure 2-24: PG&E Planning Area CSI Peak Forecast  
—Annual New Installations**



Source: Historic installations from [http://www.energy.ca.gov/renewables/emerging\\_renewables/GRID-CONNECTED\\_PV.XLS](http://www.energy.ca.gov/renewables/emerging_renewables/GRID-CONNECTED_PV.XLS)

Figure 2-25 shows the cumulative expected peak impact of the CSI program from 2007 forward compared to PG&E's forecasts submitted to the Energy Commission and to scenarios done for the *Scenario Report*. The staff forecast is very similar to PG&E's "current rates of installation" case and to the *Scenario Report* case, which assumes the current level of state incentives is maintained. That case also assumes PV costs decline in 2010 and assumes electric rates increase at 3 percent per year.

**Figure 2-25: PG&E Planning Area CSI Peak Forecasts  
—Cumulative Peak from 2006**



<sup>1</sup> The public utilities in the PG&E planning area are Calaveras Public Power Agency; Central Valley Project; Cities of Alameda, Biggs, Gridley, Healdsburg, Lodi, Lompoc, Palo Alto, Redding, Roseville, San Francisco, and Ukiah; Lassen Municipal Utility District; Merced Irrigation District; Modesto Irrigation District; Plumas-Sierra Rural Electric Cooperation; Shasta Dam Area Public Utility District; Silicon Valley Power; Tuolumne County PPA; and Turlock Irrigation District.

**Form 1.1 - PG&E Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Electricity Consumption by Sector (GWh)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	TCU	Streetlighting	Total Consumption
1980	21,424	16,527	17,852	955	6,188	3,281	515	66,741
1981	21,632	18,366	18,332	1,069	6,598	3,486	484	69,966
1982	21,116	18,465	15,924	2,933	5,385	3,744	465	68,031
1983	21,858	18,851	16,111	3,130	4,995	3,727	431	69,103
1984	22,883	19,682	16,772	3,393	6,524	4,161	416	73,832
1985	23,292	20,483	17,333	3,676	6,544	4,530	424	76,282
1986	23,180	20,743	17,490	3,106	5,509	3,943	422	74,394
1987	24,278	22,413	18,249	3,102	6,040	4,509	417	79,009
1988	25,041	23,493	19,158	3,174	6,393	4,446	431	82,137
1989	25,389	24,814	19,522	3,197	6,476	4,601	435	84,434
1990	25,844	26,022	20,071	3,188	6,512	4,685	481	86,803
1991	26,308	26,325	19,545	3,255	5,887	4,799	508	86,627
1992	26,412	27,333	19,500	3,190	6,078	4,871	499	87,883
1993	26,781	27,714	19,706	3,115	5,850	4,955	507	88,627
1994	27,013	27,850	19,784	2,838	5,772	4,854	509	88,621
1995	27,080	28,516	20,770	2,574	5,380	4,934	527	89,781
1996	28,120	29,466	20,486	2,629	5,723	5,104	542	92,069
1997	28,599	31,203	21,750	2,716	5,975	4,897	559	95,699
1998	29,596	31,156	21,117	2,563	5,000	4,841	572	94,845
1999	30,521	33,176	20,572	2,585	6,005	5,165	509	98,534
2000	31,646	34,504	20,749	2,600	6,004	5,279	552	101,334
2001	29,657	33,330	18,848	2,450	6,351	4,658	509	95,803
2002	30,537	34,689	18,278	2,342	6,440	4,948	503	97,736
2003	31,976	35,181	17,951	2,506	6,325	4,682	516	99,137
2004	32,708	35,742	18,353	2,642	6,779	4,987	532	101,744
2005	33,092	35,851	18,660	2,863	5,402	5,664	537	102,070
2006	34,531	36,853	18,894	2,946	6,285	5,746	540	105,795
2007	35,231	37,437	19,057	2,966	6,306	5,803	544	107,344
2008	35,950	37,955	19,322	2,970	6,316	5,859	547	108,918
2009	36,686	38,547	19,546	2,975	6,336	5,915	550	110,554
2010	37,405	39,125	19,686	2,975	6,359	5,969	552	112,071
2011	38,164	39,721	19,894	2,972	6,387	6,032	556	113,725
2012	38,898	40,297	19,979	2,964	6,406	6,093	559	115,196
2013	39,613	40,822	20,126	2,952	6,439	6,154	562	116,668
2014	40,329	41,375	20,161	2,940	6,456	6,214	565	118,041
2015	41,048	41,941	20,259	2,929	6,484	6,274	567	119,502
2016	41,767	42,527	20,320	2,915	6,510	6,332	570	120,942
2017	42,488	43,102	20,375	2,899	6,529	6,390	573	122,356
2018	43,214	43,980	20,372	2,881	6,549	6,447	575	124,018

**Annual Growth Rates (%)**

1980-1990	1.9	4.6	1.2	12.8	0.5	3.6	-0.7	2.7
1990-2000	2.0	2.9	0.3	-2.0	-0.8	1.2	1.4	1.6
2000-2005	0.9	0.8	-2.1	1.9	-2.1	1.4	-0.5	0.1
2005-2008	2.8	1.9	1.2	1.2	5.3	1.1	0.6	2.2
2008-2018	1.9	1.5	0.5	-0.3	0.4	1.0	0.5	1.3
2005-2018	2.1	1.6	0.7	0.0	1.5	1.0	0.5	1.5

**Form 1.1b - PG&E Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Electricity Sales by Sector (GWh)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	TCU	Streetlighting	Total Consumption
1980	21,424	16,527	17,178	955	6,188	3,281	515	66,067
1981	21,632	18,366	17,641	1,069	6,598	3,486	484	69,276
1982	21,116	18,456	15,162	2,911	5,385	3,744	465	67,238
1983	21,858	18,832	15,226	3,048	4,994	3,724	431	68,113
1984	22,883	19,662	15,987	3,301	6,524	4,146	416	72,918
1985	23,291	20,416	16,482	3,567	6,540	4,480	424	75,201
1986	23,178	20,652	16,342	2,707	5,502	3,840	422	72,643
1987	24,274	22,255	16,313	2,463	6,033	4,397	417	76,153
1988	25,036	23,163	16,829	2,411	6,385	4,329	431	78,584
1989	25,383	24,460	17,134	2,108	6,468	4,482	435	80,470
1990	25,837	25,638	17,638	2,015	6,504	4,556	481	82,670
1991	26,302	25,915	17,320	2,024	5,878	4,668	508	82,615
1992	26,406	26,919	17,276	1,978	6,069	4,741	499	83,887
1993	26,774	27,277	16,592	1,900	5,847	4,811	507	83,708
1994	27,013	27,408	16,536	1,634	5,770	4,730	509	83,601
1995	27,080	28,073	17,531	1,391	5,378	4,810	527	84,789
1996	28,120	29,020	16,752	1,412	5,720	4,979	542	86,545
1997	28,599	30,765	17,960	1,444	5,972	4,785	559	90,084
1998	29,596	30,721	17,699	1,278	4,997	4,728	572	89,592
1999	30,521	32,736	17,157	1,407	6,005	5,064	509	93,399
2000	31,646	34,066	17,595	1,409	6,004	5,180	552	96,451
2001	29,657	33,102	15,795	1,371	6,351	4,445	509	91,230
2002	30,537	34,304	14,919	1,223	6,440	4,912	503	92,838
2003	31,976	34,883	14,289	1,357	6,325	4,650	516	93,995
2004	32,708	35,440	15,205	1,483	6,779	4,961	532	97,109
2005	33,092	35,490	15,611	1,780	5,402	5,638	537	97,550
2006	34,529	36,437	15,769	1,836	6,285	5,718	540	101,114
2007	35,227	36,937	15,868	1,833	6,306	5,775	544	102,489
2008	35,944	37,336	16,068	1,814	6,316	5,831	547	103,856
2009	36,679	37,776	16,229	1,797	6,336	5,886	550	105,252
2010	37,396	38,167	16,305	1,774	6,359	5,940	552	106,494
2011	38,153	38,541	16,450	1,748	6,387	6,002	556	107,837
2012	38,885	38,869	16,500	1,728	6,406	6,063	559	109,011
2013	39,599	39,113	16,613	1,704	6,439	6,124	562	110,152
2014	40,313	39,351	16,618	1,682	6,456	6,183	565	111,168
2015	41,030	39,566	16,682	1,658	6,484	6,243	567	112,231
2016	41,748	39,767	16,710	1,633	6,510	6,301	570	113,239
2017	42,467	39,922	16,733	1,605	6,529	6,359	573	114,189
2018	43,191	40,337	16,688	1,572	6,549	6,415	575	115,327

**Annual Growth Rates (%)**

1980-1990	1.9	4.5	0.3	7.8	0.5	3.3	-0.7	2.3
1990-2000	2.0	2.9	0.0	-3.5	-0.8	1.3	1.4	1.6
2000-2005	0.9	0.8	-2.4	4.8	-2.1	1.7	-0.5	0.2
2005-2008	2.8	1.7	1.0	0.6	5.3	1.1	0.6	2.1
2008-2018	1.9	0.8	0.4	-1.4	0.4	1.0	0.5	1.1
2005-2018	2.1	1.0	0.5	-1.0	1.5	1.0	0.5	1.3



**Form 1.2 - PG&E Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Net Energy for Load (GWh)**

	Total Consumption	Net Losses	Gross Generation	Private Supply	Net Energy for Load
1980	66,741	6,342	73,084	674	72,410
1981	69,966	6,651	76,617	690	75,927
1982	68,031	6,455	74,486	793	73,692
1983	69,103	6,539	75,641	989	74,652
1984	73,832	7,000	80,832	914	79,919
1985	76,282	7,219	83,501	1,081	82,420
1986	74,394	6,974	81,368	1,751	79,616
1987	79,009	7,311	86,320	2,856	83,463
1988	82,137	7,544	89,681	3,553	86,128
1989	84,434	7,725	92,159	3,963	88,196
1990	86,803	7,936	94,739	4,133	90,606
1991	86,627	7,931	94,558	4,012	90,546
1992	87,883	8,053	95,936	3,996	91,940
1993	88,627	8,036	96,663	4,919	91,744
1994	88,621	8,026	96,647	5,020	91,626
1995	89,781	8,140	97,921	4,992	92,929
1996	92,069	8,308	100,378	5,525	94,853
1997	95,699	8,648	104,347	5,615	98,732
1998	94,845	8,601	103,446	5,253	98,192
1999	98,534	8,966	107,501	5,136	102,365
2000	101,334	9,259	110,594	4,883	105,710
2001	95,803	8,758	104,561	4,573	99,988
2002	97,736	8,912	106,649	4,898	101,751
2003	99,137	9,024	108,160	5,142	103,019
2004	101,744	9,322	111,067	4,635	106,431
2005	102,070	9,365	111,434	4,520	106,914
2006	105,795	9,707	115,502	4,681	110,821
2007	107,344	9,839	117,183	4,854	112,328
2008	108,918	9,970	118,888	5,061	113,826
2009	110,554	10,104	120,659	5,302	115,356
2010	112,071	10,223	122,295	5,578	116,717
2011	113,725	10,352	124,078	5,889	118,189
2012	115,196	10,465	125,661	6,185	119,476
2013	116,668	10,575	127,243	6,516	120,727
2014	118,041	10,672	128,713	6,873	121,840
2015	119,502	10,774	130,277	7,272	123,005
2016	120,942	10,871	131,813	7,703	124,110
2017	122,356	10,962	133,318	8,167	125,151
2018	124,018	11,071	135,089	8,691	126,398

**Annual Growth Rates (%)**

1980-1990	2.7	2.3	2.6	19.9	2.3
1990-2000	1.6	1.6	1.6	1.7	1.6
2000-2005	0.1	0.2	0.2	-1.5	0.2
2005-2008	2.2	2.1	2.2	3.8	2.1
2008-2018	1.3	1.1	1.3	5.6	1.1
2005-2018	1.5	1.3	1.5	5.2	1.3

**Form 1.3 - PG&E Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Coincident Peak Demand by Sector (MW)**

Year	Residential	Commercial	Industrial	Agricultural	Other	Total Demand
1980	4,794	3,300	2,829	1,287	449	12,660
1981	4,645	3,522	2,842	1,347	463	12,820
1982	3,865	3,326	2,558	1,016	466	11,232
1983	4,711	3,736	2,786	776	501	12,510
1984	4,952	4,047	3,024	1,055	574	13,651
1985	5,608	3,967	2,642	1,255	568	14,040
1986	4,710	3,857	2,962	1,044	519	13,092
1987	4,783	4,047	2,970	1,108	572	13,480
1988	5,989	4,635	2,941	1,258	577	15,400
1989	5,405	5,038	2,982	1,016	597	15,037
1990	6,014	4,934	3,345	1,295	615	16,203
1991	5,933	4,931	2,869	1,192	601	15,526
1992	5,486	5,027	3,210	1,199	622	15,544
1993	6,137	5,314	3,246	1,092	640	16,431
1994	6,004	5,274	3,319	1,163	648	16,408
1995	6,354	5,544	3,561	1,054	680	17,192
1996	7,095	5,866	3,452	1,094	682	18,189
1997	6,900	6,176	3,684	1,148	659	18,567
1998	7,869	6,465	3,597	941	654	19,526
1999	8,063	6,515	3,027	1,130	664	19,399
2000	8,158	7,019	2,957	863	660	19,658
2001	7,377	6,481	2,854	1,226	617	18,554
2002	8,381	6,606	2,710	1,217	644	19,557
2003	8,201	7,082	2,656	910	601	19,450
2004	7,538	7,102	3,304	1,061	697	19,702
2005	8,586	6,936	2,933	1,048	755	20,257
2006	9,892	7,205	3,440	1,249	799	22,585
2007	9,672	7,008	3,327	1,201	774	21,983
2008	9,863	7,099	3,367	1,201	782	22,312
2009	10,057	7,201	3,401	1,204	789	22,652
2010	10,250	7,302	3,420	1,208	796	22,976
2011	10,467	7,406	3,449	1,213	805	23,339
2012	10,682	7,507	3,458	1,215	813	23,674
2013	10,895	7,599	3,476	1,221	821	24,013
2014	11,109	7,697	3,476	1,222	829	24,333
2015	11,324	7,797	3,487	1,227	837	24,670
2016	11,537	7,901	3,491	1,230	844	25,004
2017	11,750	8,003	3,493	1,233	852	25,331
2018	11,965	8,187	3,486	1,235	860	25,733

**Annual Growth Rates (%)**

1980-1990	2.3	4.1	1.7	0.1	3.2	2.5
1990-2000	3.1	3.6	-1.2	-4.0	0.7	2.0
2000-2005	1.0	-0.2	-0.2	4.0	2.7	0.6
2005-2008	4.7	0.8	4.7	4.7	1.2	3.3
2008-2018	2.0	1.4	0.3	0.3	1.0	1.4
2005-2018	2.6	1.3	1.3	1.3	1.0	1.9

**Form 1.4 - PG&E Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Peak Demand (MW)**

Year	Total End Use Load	Net Losses	Gross Generation	Private Supply	Net Peak Demand	Load Factor (%)
1980	12,660	1,217	13,877	113	13,764	60.1
1981	12,820	1,232	14,052	116	13,936	62.2
1982	11,232	1,077	12,308	133	12,175	69.1
1983	12,510	1,197	13,707	166	13,541	62.9
1984	13,651	1,309	14,961	153	14,807	61.6
1985	14,040	1,344	15,385	181	15,203	61.9
1986	13,092	1,241	14,334	294	14,040	64.7
1987	13,480	1,261	14,741	479	14,262	66.8
1988	15,400	1,436	16,836	596	16,239	60.5
1989	15,037	1,394	16,431	665	15,765	63.9
1990	16,203	1,504	17,707	694	17,013	60.8
1991	15,526	1,441	16,967	673	16,294	63.4
1992	15,544	1,443	16,987	671	16,316	64.3
1993	16,431	1,514	17,944	826	17,119	61.2
1994	16,408	1,510	17,917	843	17,074	61.3
1995	17,192	1,586	18,778	838	17,940	59.1
1996	18,189	1,674	19,864	927	18,936	57.2
1997	18,567	1,710	20,277	943	19,334	58.3
1998	19,526	1,808	21,334	882	20,452	54.8
1999	19,399	1,798	21,197	862	20,335	57.5
2000	19,658	1,827	21,485	820	20,666	58.4
2001	18,554	1,725	20,280	768	19,512	58.5
2002	19,557	1,817	21,375	822	20,552	56.5
2003	19,450	1,803	21,253	863	20,390	57.7
2004	19,702	1,836	21,538	778	20,760	58.5
2005	20,257	1,888	22,145	791	21,354	57.2
2006	22,585	2,107	24,692	858	23,834	53.1
2007	21,983	2,044	24,027	908	23,118	55.5
2008	22,312	2,071	24,383	958	23,424	55.5
2009	22,652	2,099	24,752	1,009	23,743	55.5
2010	22,976	2,126	25,102	1,059	24,043	55.4
2011	23,339	2,156	25,495	1,109	24,387	55.3
2012	23,674	2,185	25,859	1,151	24,708	55.2
2013	24,013	2,213	26,226	1,194	25,032	55.1
2014	24,333	2,241	26,574	1,235	25,339	54.9
2015	24,670	2,269	26,939	1,277	25,662	54.7
2016	25,004	2,297	27,301	1,320	25,981	54.5
2017	25,331	2,325	27,656	1,361	26,295	0.0
2018	25,733	2,360	28,093	1,406	26,687	0.0

**Annual Growth Rates (%)**

1980-1990	2.5	2.1	2.5	19.9	2.1	0.1
1990-2000	2.0	2.0	2.0	1.7	2.0	-0.4
2000-2005	0.6	0.7	0.6	-0.7	0.7	-0.4
2005-2008	3.3	3.1	3.3	6.6	3.1	-1.0
2008-2018	1.4	1.3	1.4	3.9	1.3	-100.0
2005-2018	1.9	1.7	1.8	4.5	1.7	-100.0

**Form 1.7a - PG&E Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Private Supply by Sector (GWh)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	TCU	Streetlighting	Total Consumption
1980	0	0	674	0	0	0	0	674
1981	0	0	690	0	0	0	0	690
1982	0	10	762	21	0	0	0	793
1983	0	19	884	82	0	3	0	989
1984	0	21	785	93	0	15	0	914
1985	1	67	851	109	4	50	0	1,081
1986	2	91	1,148	399	7	104	0	1,751
1987	4	158	1,936	639	7	112	0	2,856
1988	5	330	2,330	763	8	117	0	3,553
1989	6	354	2,388	1,089	8	119	0	3,963
1990	7	383	2,433	1,173	8	129	0	4,133
1991	7	410	2,225	1,231	9	131	0	4,012
1992	6	414	2,225	1,212	10	131	0	3,996
1993	7	437	3,113	1,215	3	144	0	4,919
1994	0	442	3,248	1,203	3	124	0	5,020
1995	0	443	3,239	1,183	3	124	0	4,992
1996	0	446	3,734	1,217	3	125	0	5,525
1997	0	438	3,790	1,272	3	112	0	5,615
1998	0	435	3,418	1,285	3	113	0	5,253
1999	0	440	3,416	1,178	0	101	0	5,136
2000	0	439	3,154	1,191	0	100	0	4,883
2001	0	228	3,053	1,079	0	213	0	4,573
2002	0	385	3,358	1,119	0	36	0	4,898
2003	0	298	3,662	1,149	0	33	0	5,142
2004	0	302	3,148	1,159	0	26	0	4,635
2005	0	362	3,049	1,083	0	26	0	4,520
2006	2	415	3,126	1,110	0	27	0	4,681
2007	4	500	3,189	1,133	0	28	0	4,854
2008	6	619	3,253	1,155	0	28	0	5,061
2009	7	771	3,317	1,178	0	29	0	5,302
2010	9	958	3,381	1,201	0	29	0	5,578
2011	11	1,180	3,445	1,223	0	30	0	5,889
2012	12	1,428	3,479	1,236	0	30	0	6,185
2013	14	1,710	3,514	1,248	0	30	0	6,516
2014	16	2,024	3,544	1,259	0	31	0	6,873
2015	17	2,375	3,578	1,271	0	31	0	7,272
2016	19	2,760	3,610	1,282	0	31	0	7,703
2017	21	3,179	3,642	1,293	0	32	0	8,167
2018	22	3,643	3,684	1,309	0	32	0	8,691

**Annual Growth Rates (%)**

1980-1990			13.7				19.9
1990-2000		1.4	2.6	0.2		-2.5	1.7
2000-2005		-3.8	-0.7	-1.9		-23.3	-1.5
2005-2008		19.6	2.2	2.2		2.2	3.8
2008-2018	14.7	19.4	1.3	1.3		1.3	5.6
2005-2018		19.4	1.5	1.5		1.5	5.2

**Form 2.2 - PG&E Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Planning Area Economic and Demographic Assumptions**

Year	Population	Households	Persons per Household	Real Personal Income (Millions 2005\$)	Industrial Value Added (Millions 2005\$)
1980	8,584,529	3,270,576	2.62	82,133	12,902
1981	8,680,391	3,306,645	2.63	83,816	13,204
1982	8,795,963	3,338,700	2.63	84,556	12,795
1983	9,047,698	3,400,158	2.66	88,649	12,953
1984	9,283,230	3,469,059	2.68	96,329	13,620
1985	9,511,283	3,551,748	2.68	100,669	13,994
1986	9,718,571	3,635,161	2.67	104,437	14,184
1987	9,876,855	3,706,217	2.66	107,357	14,790
1988	10,047,184	3,774,571	2.66	111,757	15,557
1989	10,273,788	3,848,713	2.67	115,270	16,123
1990	10,450,128	3,897,421	2.68	117,650	16,469
1991	10,678,197	3,961,902	2.70	117,599	15,937
1992	10,874,483	4,011,740	2.71	121,620	15,878
1993	11,037,375	4,055,134	2.72	122,653	15,868
1994	11,125,194	4,095,706	2.72	124,591	15,791
1995	11,221,517	4,135,477	2.71	129,274	16,659
1996	11,331,199	4,173,736	2.71	135,001	16,411
1997	11,538,191	4,216,615	2.74	142,376	17,471
1998	11,684,836	4,265,384	2.74	153,271	17,603
1999	11,859,729	4,319,650	2.75	164,126	17,030
2000	12,059,436	4,359,928	2.77	184,216	17,401
2001	12,300,043	4,419,852	2.78	181,285	15,249
2002	12,481,905	4,477,894	2.79	177,438	14,711
2003	12,648,774	4,537,025	2.79	178,341	14,289
2004	12,813,021	4,603,164	2.78	185,801	15,022
2005	12,970,814	4,675,635	2.77	190,371	15,308
2006	13,156,913	4,737,587	2.78	197,627	15,553
2007	13,343,058	4,799,431	2.78	205,511	15,731
2008	13,529,227	4,861,162	2.78	213,587	16,000
2009	13,715,424	4,922,780	2.79	221,858	16,215
2010	13,901,209	4,984,124	2.79	229,763	16,364
2011	14,106,113	5,051,188	2.79	237,561	16,562
2012	14,311,039	5,118,128	2.80	244,824	16,660
2013	14,515,973	5,184,941	2.80	251,656	16,794
2014	14,720,926	5,251,623	2.80	258,398	16,837
2015	14,925,894	5,318,183	2.81	265,101	16,930
2016	15,130,871	5,384,613	2.81	271,760	16,996
2017	15,335,856	5,450,920	2.81	278,376	17,050
2018	15,540,852	5,517,093	2.82	285,037	17,056

**Annual Growth Rates (%)**

1980-1990	2.0	1.8	0.2	3.7	2.5
1990-2000	1.4	1.1	0.3	4.6	0.6
2000-2005	1.5	1.4	0.1	0.7	-2.5
2005-2008	1.4	1.3	0.1	3.9	1.5
2008-2018	1.4	1.3	0.1	2.9	0.6
2005-2018	1.4	1.3	0.1	3.2	0.8

## **CHAPTER 3: SOUTHERN CALIFORNIA EDISON PLANNING AREA**

The Southern California Edison (SCE) planning area includes (1) SCE bundled retail customers, (2) customers served by energy service providers (ESPs) using the SCE distribution system to deliver electricity to end users, and (3) customers of the various southern California municipal and irrigation district utilities with the exception of the cities of Los Angeles, Pasadena, Glendale, and Burbank and the Imperial Irrigation District. Also excluded from the SCE planning area is San Diego County and the southern portion of Orange County served by SDG&E.

This chapter is organized as follows. It first presents forecasted consumption and peak loads for the SCE planning area, including both total and per capita values. The draft CED 2008 values are compared to the adopted CED 2006 forecast; differences between the two forecasts are explained. The forecasted load factor, jointly determined by the consumption and peak load estimates, is also discussed. Next, it presents sector consumption and peak load forecasts. The residential, commercial, industrial, and “other” sector forecasts are compared to those in CED 2006; again, differences between the two are discussed. Finally, the chapter presents the sector electricity prices used as inputs to the CED 2008 forecast.

### **Forecast Results**

Table 3-1 compares the CED 2006 and draft CED 2008 forecasts of electricity consumption and peak demand for selected years. The draft CED 2008 electricity consumption forecast is 1.6 percent higher than the CED 2006 forecast in the starting year. This is primarily because of higher saturation of air conditioning and an increase in assumed short-term income growth shift up the residential forecast. The forecasted growth rates for both forecasts are very similar in the post-2008 period, so that the draft CED 2008 forecast is approximately 2 percent higher than the CED 2006 forecast in 2016. Peak forecast differences are also mainly due to the starting point. As in the PG&E planning area forecast, the staff previously revised its projection of 2007 and 2008 peaks from the original projections made in the CED 2006 forecast, based on actual temperatures and weather normalized load growth. The recently adopted 2008 SCE service area peak is used as the starting point of the draft CED 2008 peak forecast. This increase is maintained throughout the forecast period, as the post-2008 projected growth rates are very similar.

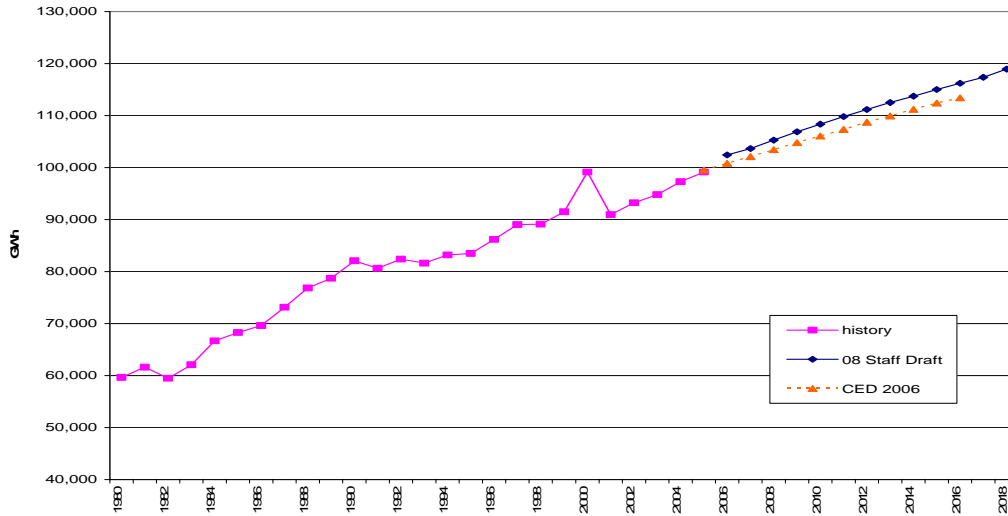
**Table 3-1: SCE Planning Area Forecast Comparison**

Consumption (GWH)				Peak (MW)		
	CED 2006	Staff Draft	Percent Difference Staff Draft/CED 2006	CED 2006	Staff Draft	Percent Difference Staff Draft/CED 2006
1990	81,579	82,069	0.60%	17,564	17,635	0.41%
2000	98,346	99,148	0.81%	19,465	19,408	-0.29%
2005	99,531	99,136	-0.40%	21,510	21,956	2.07%
2008	103,437	105,106	1.61%	22,483	23,142	2.93%
2013	109,931	112,064	1.94%	24,059	24,674	2.55%
2016	113,409	115,627	1.96%	24,934	25,513	2.32%
Annual Average Growth Rates						
1990-2000	1.89%	1.91%		1.03%	0.96%	
2000-2005	0.24%	0.00%		2.02%	2.50%	
2005-2008	1.29%	1.97%		1.49%	1.77%	
2008-2016	1.16%	1.20%		1.30%	1.23%	
Historic values are shaded						

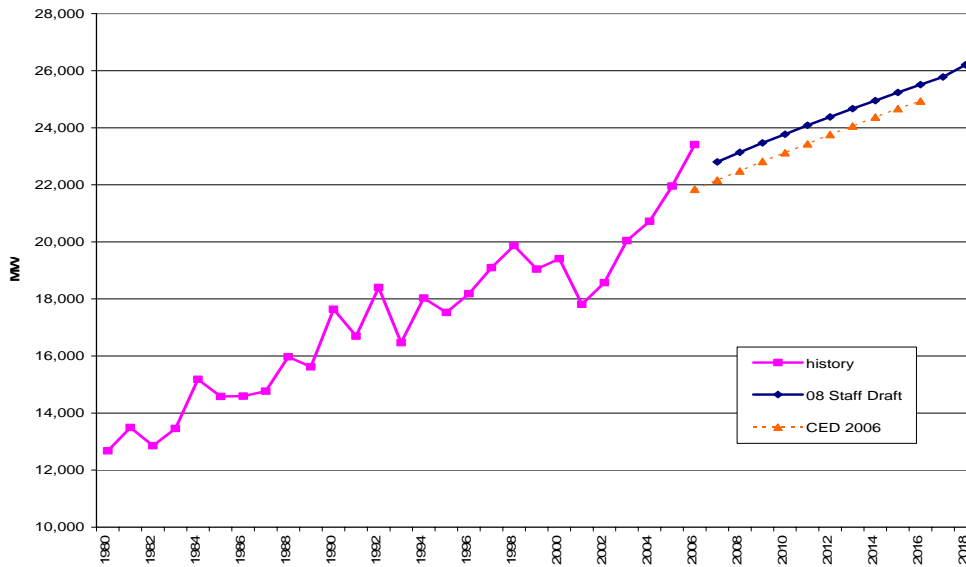
As shown in Figure 3-1, the draft CED 2008 electricity consumption forecast is about 1.6 percent higher at the beginning of the forecast period due to increases in the residential forecast. This difference increases to about 2 percent at the end of the forecast. The post-2008 growth rates of the two forecasts are very similar.

The draft CED 2008 SCE planning area peak demand forecast, shown in Figure 3-2, is higher over the entire forecast period compared to the CED 2006 forecast. This is consistent with the analysis done for the annual updates of the peak forecast described previously. The CED 2008 peak forecast starts below the recorded 2006 peak value because the CED 2008 forecast is based on normal, or “1-in 2,” weather conditions rather than the above normal peak temperatures seen in 2006. While the draft CED 2008 forecasted peak has a higher initial starting point than the CED 2006 forecast, the rate of growth in peak demand is similar for both forecasts.

**Figure 3-1: SCE Planning Area Electricity Forecast**



**Figure 3-2: SCE Planning Area Peak**

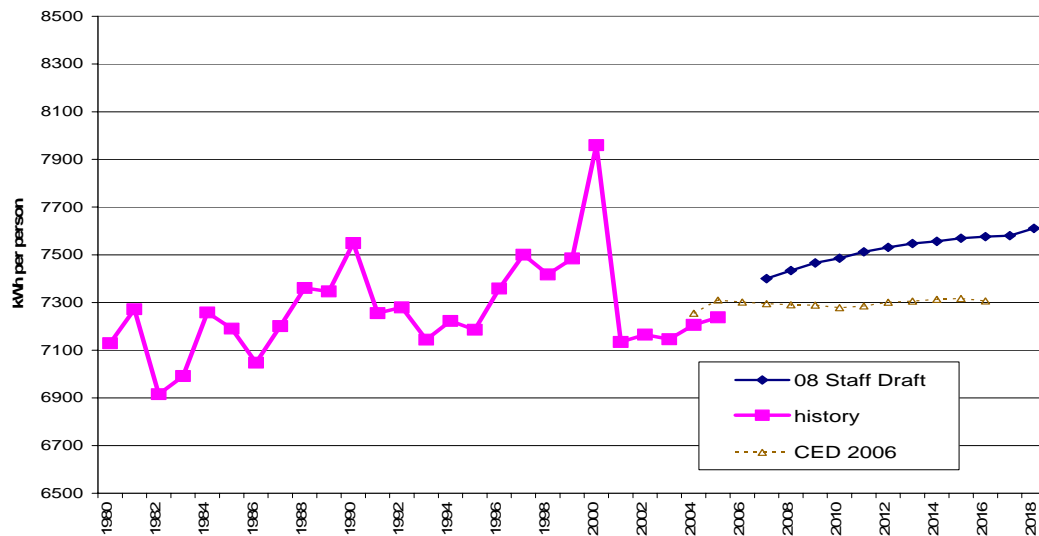


As Figure 3-3 shows, per capita electricity consumption is higher in the draft CED 2008 throughout the entire forecast than in the CED 2006 forecast. Per capita consumption in the draft CED 2008 forecast increases over the forecast period, unlike the relatively flat projections in the previous forecast. These differences are mainly due to increased growth in the residential and commercial forecasts. Per capita consumption in the draft CED 2008 forecast does not return to the pre-energy crisis levels until 2010 and remains well below the 2000 value throughout the forecast period.



Figure 3-4 provides a comparison of per capita peak demand. The draft CED 2008 forecast is higher due to a higher starting point value caused by the annual peak forecast updates described earlier. The initial starting point of the draft CED 2008 forecast is lower than the 2006 value because the forecast uses assumed normal peak weather, and the historic values are not weather normalized. Peak weather in 2006 was above normal in all of the utility planning areas.

**Figure 3-3: SCE Planning Area per Capita Electricity Consumption**



**Figure 3-4: SCE Planning Area per Capita Peak Demand**

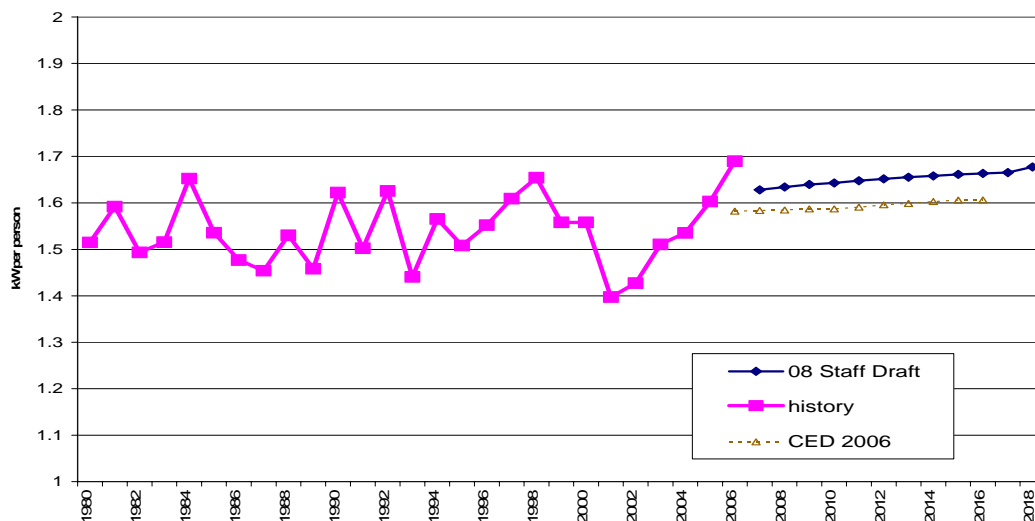
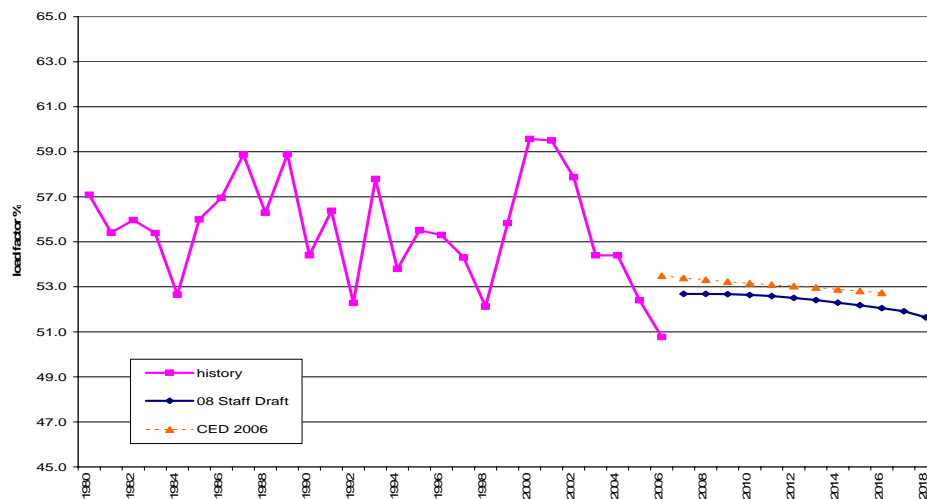


Figure 3-5 compares the load factors for the draft CED 2008 and CED 2006 forecasts. The load factor is a measure of the relative increase in peak demand with respect to annual electricity consumption. Lower load factors indicate a sharper

needle peak, and higher load factors indicate a more stable load. Historic variation in load factors is caused in part by variation in annual weather patterns. In southern California, recent peak temperatures before 2006 were lower than the 54-year median value, resulting in higher-than-expected load factors. The 2006 load factor is low because of the higher-than-normal peak conditions experienced last summer. The draft CED 2008 projected load factors are on the low end of the range of recent values.

Over the forecast period, the draft CED 2008 load factor declines slightly, which is consistent with higher weather-sensitive load growth in relation to baseload energy growth. Consumption in the SCE planning area is shifting toward residential and commercial sectors and away from the industrial sectors. Growth is also increasingly taking place in hotter inland areas leading to greater saturation of central air conditioning and greater use of air conditioning equipment compared to earlier concentrations in cooler coastal areas. Additionally, air conditioning loads are increasing along the coast as more households install air conditioning units for the few days they may be needed each year.

**Figure 3-5: SCE Planning Area Load Factor**



## Sector Level Results and Input Assumptions

### ***Residential***

Figure 3-6 provides a comparison of the draft CED 2008 and CED 2006 SCE planning area residential forecasts. The draft CED 2008 forecast is higher throughout the entire forecast period, in large part due to a higher 2007 starting point. This starting point difference is a result of increases in near-term economic growth projections. The growth rates of the two forecasts are virtually identical.

**Figure 3-6: SCE Planning Area Residential Consumption**

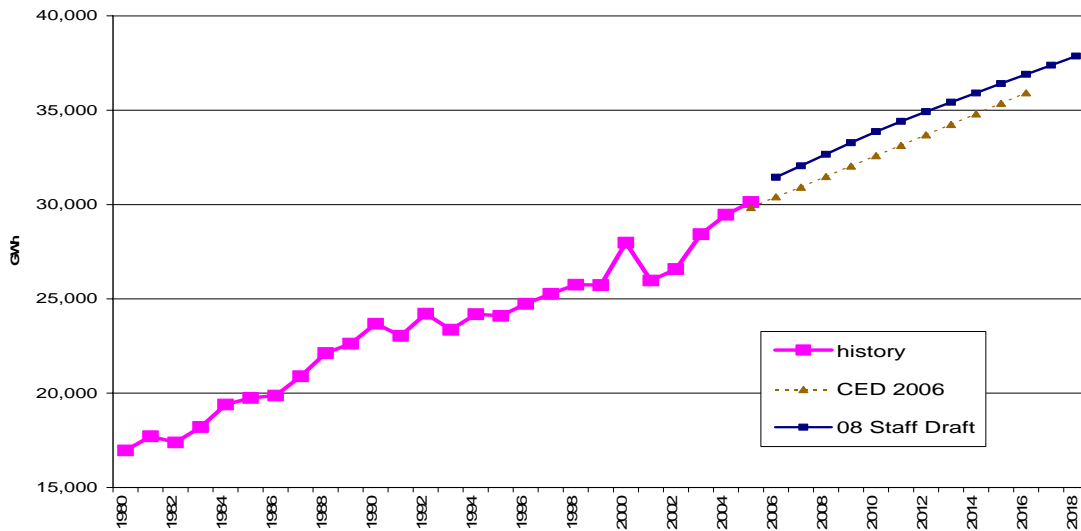
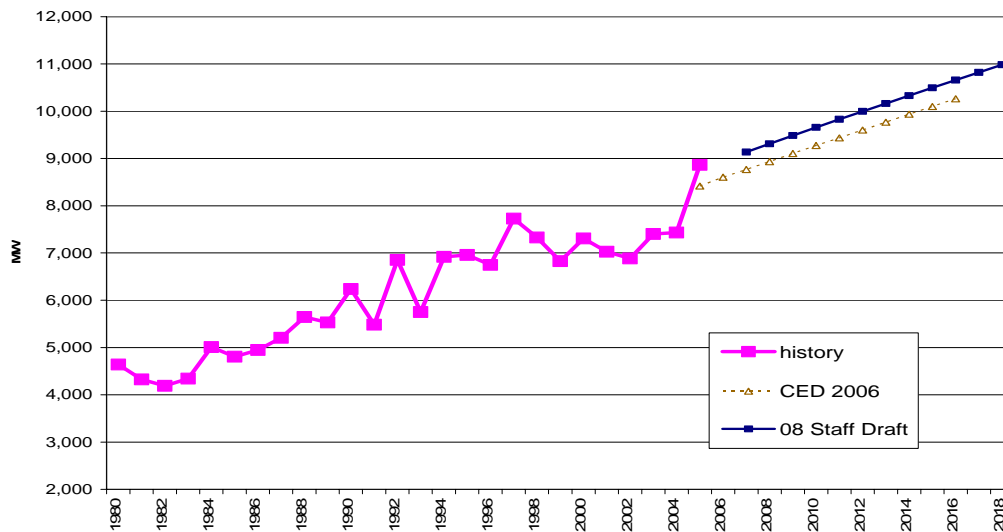


Figure 3-7 provides a comparison of the draft CED 2008 and CED 2006 residential peak demand forecasts. As is the case for residential consumption, the draft CED 2008 residential peak forecast is higher than CED 2006. The difference between the two peak forecasts is similar to the difference in the electricity consumption forecasts.

**Figure 3-7: SCE Planning Area Residential Peak**



Figures 3-8 and 3-9 provide comparisons of the residential drivers used in the draft CED 2008 forecast with the CED 2006 values. Figure 3-8 provides comparisons of total population, total households, and persons per household projections. The draft CED 2008 forecast of total population is slightly lower as it is based on a revised

split of the Los Angeles county population into component planning areas. In addition, incorporation of updated historic estimates leads to a slight downward revision in projected persons per household. The draft CED 2008 persons per household projections incorporate annual Department of Finance E-5A interim updates to county population and household estimates through 2005. The interim estimates indicate that the average number of persons per household in the SCE region has increased at a slightly slower rate than was projected in the CED 2006 forecast, and this has decreased the current 2005 actual estimate of persons per household. The draft CED 2008 projected growth in persons per household per year is assumed to be half of the annual 1990-2005 growth. This is essentially the same growth rate that was used in the CED 2003 projection. The net result of these changes is a slightly lower household forecast than was used in the CED 2006 forecast.

**Figure 3-8: SCE Planning Area Residential Demographic Projections**

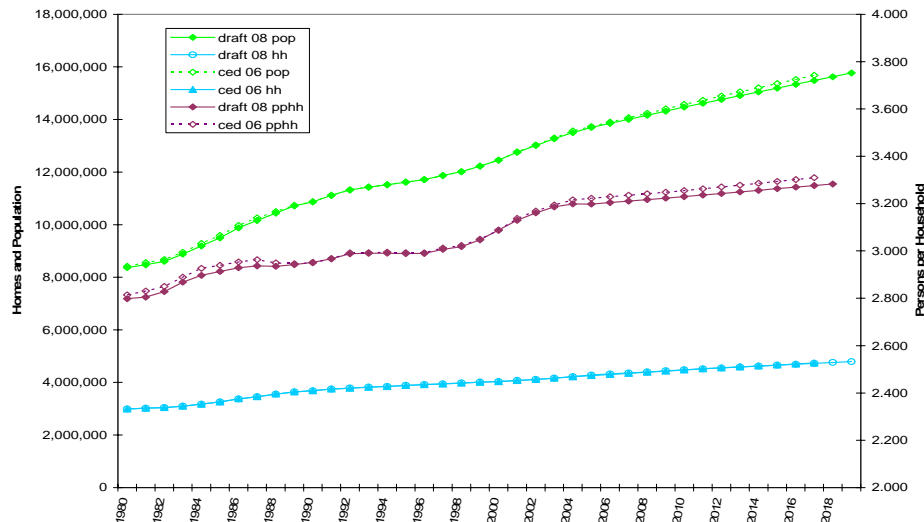
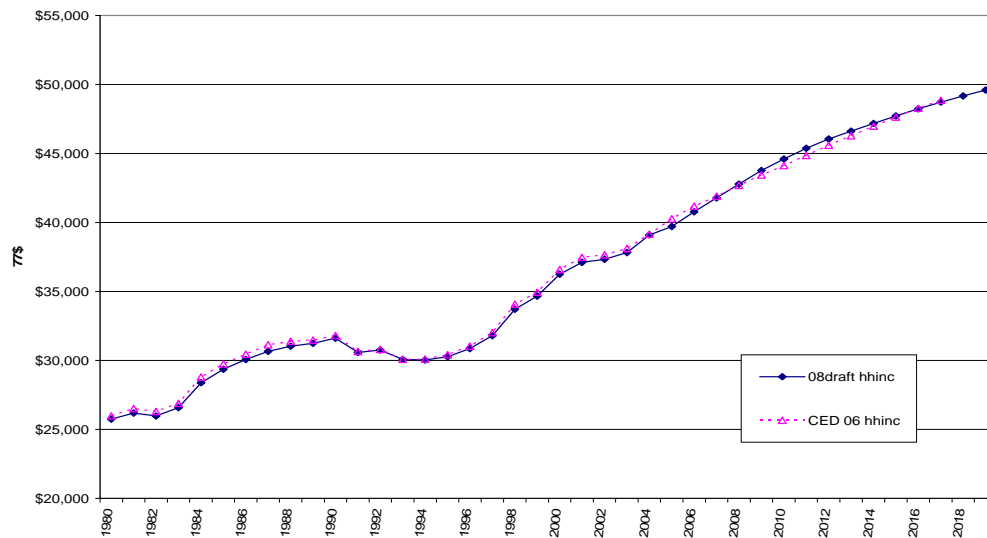


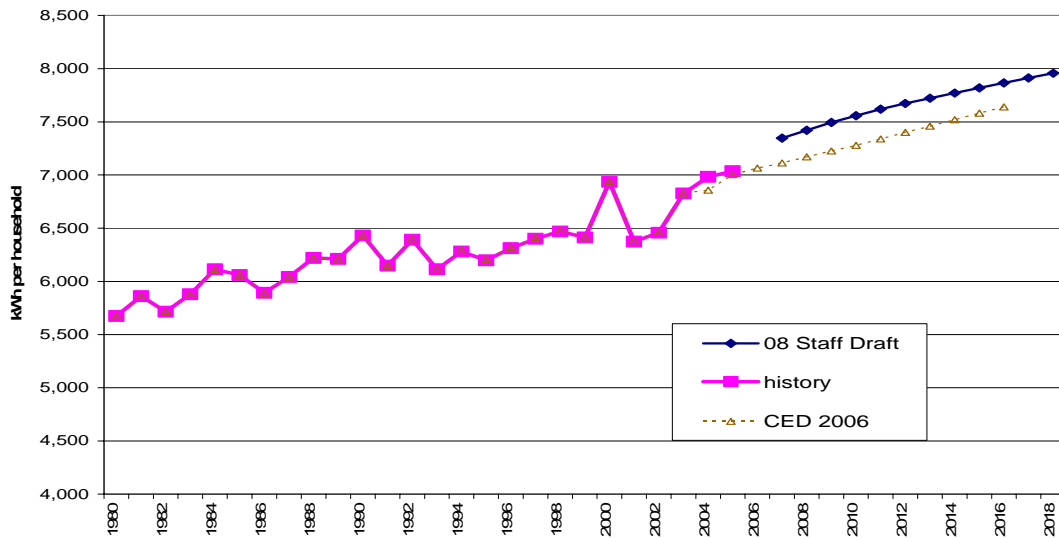
Figure 3-9 provides a comparison of household income between the two forecasts. Household income is derived as the product of per capita income and persons per household. The draft CED 2008 projection grows at a slightly higher rate in the short- to mid-term because of the new, more optimistic economic forecast. The higher growth tails off toward the end of the forecast period so that projected income is essentially the same as in the previous forecast for 2014 and beyond. The higher household income growth serves to increase forecasted residential consumption in the short term.

**Figure 3-9: SCE Planning Area Household Income Projections**

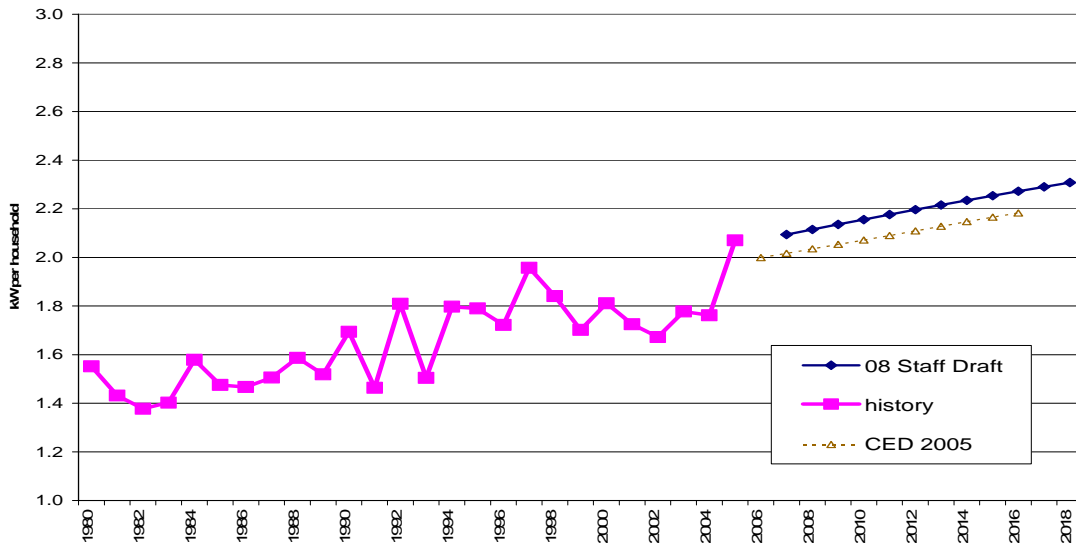


Figures 3-10 and 3-11 present comparisons of use per household between the two forecasts. Figure 3-10 is a comparison of annual electricity use per household, and Figure 3-11 is a comparison of peak demand per household. The draft CED 2008 forecast of use per household is somewhat higher than that projected in CED 2006. This is primarily due to higher short-term household income growth projections. Staff is currently in the process of analyzing recently submitted 2006 QFER data in order to verify the higher per-household use. The forecasted growth rate for use per household is similar in both forecasts. Differences in peak use per household are primarily driven by the annual peak forecast update in 2006, which increased the SCE planning area 2007 peak forecast.

**Figure 3-10: SCE Planning Area Use per Household**



**Figure 3-11: SCE Planning Area Peak Use per Household**



## Commercial Building Sector

Figure 3-12 provides a comparison of the commercial building sector forecasts. The draft CED 2008 forecast is higher throughout the entire forecast period. The draft CED 2008 forecast's starting value is close to that projected in CED 2006, but the new forecast grows at a faster rate than the previous. This is caused mainly by revisions in the estimation of commercial square footage in the SCE planning area. The increase in the final forecast year is the result of declining energy efficiency program savings impacts due to program lifetime decay.

**Figure 3-12: SCE Planning Area Commercial Consumption**

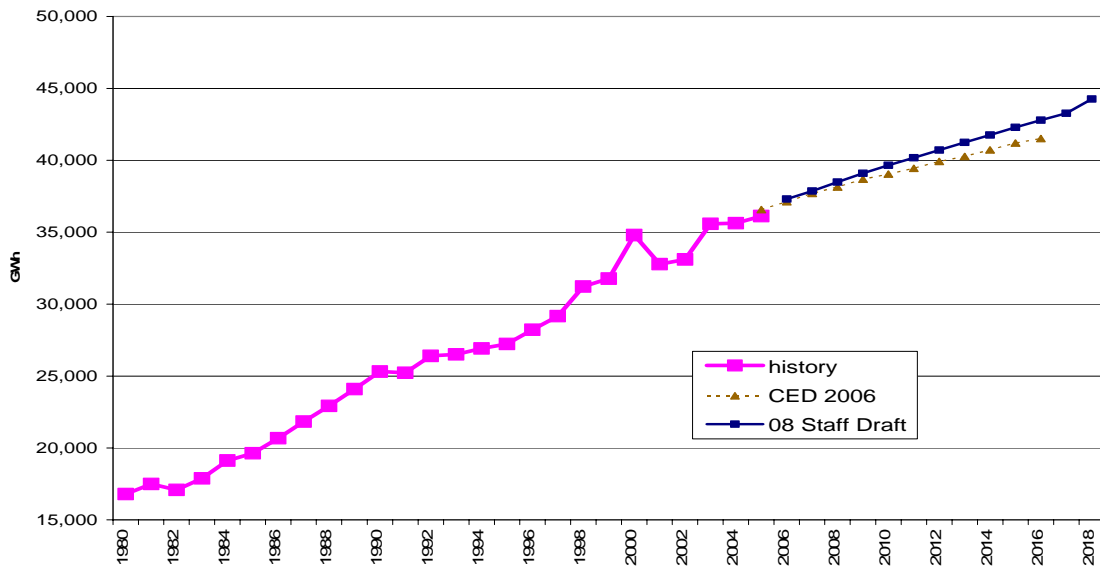
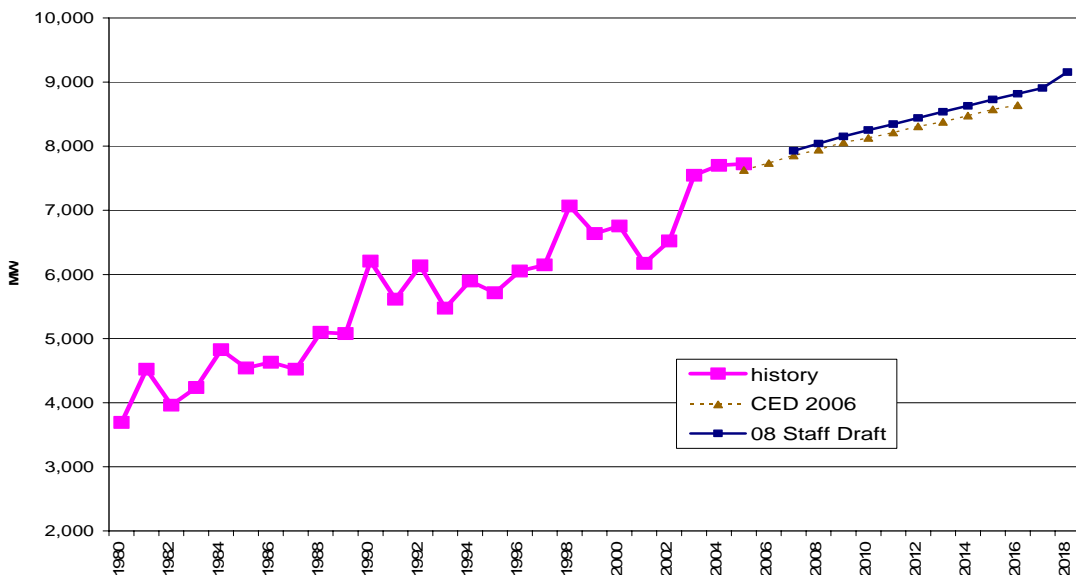


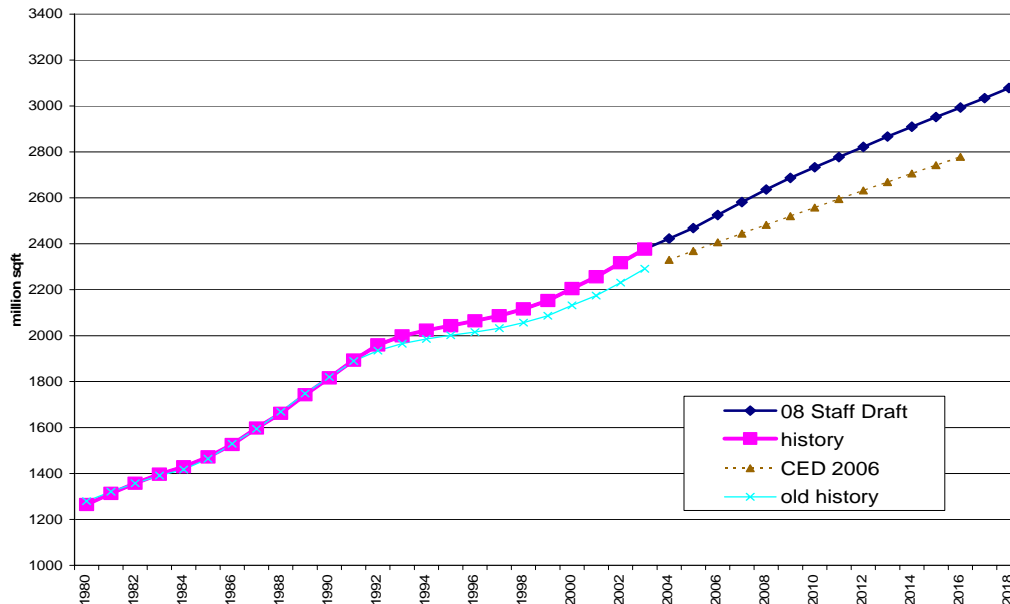
Figure 3-13 provides a comparison of the commercial peak demand forecasts. Growth in the commercial peak demand forecasts is driven primarily by the underlying electricity consumption forecasts. Therefore, the consumption and peak forecasts exhibit the same patterns.

**Figure 3-13: SCE Planning Area Commercial Sector Peak**



In staff's commercial building sector forecasting model, floor space by building type (for example, retail, schools, offices, and so forth) is the key driver for energy consumption and peak demand. Figure 3-14 provides a comparison of total commercial floor space projections. Both historic and forecast values for the draft CED 2008 floor space projections are higher throughout the forecast period than those projected in CED 2006 because of changes in the estimation methodology, described in Chapter 1.

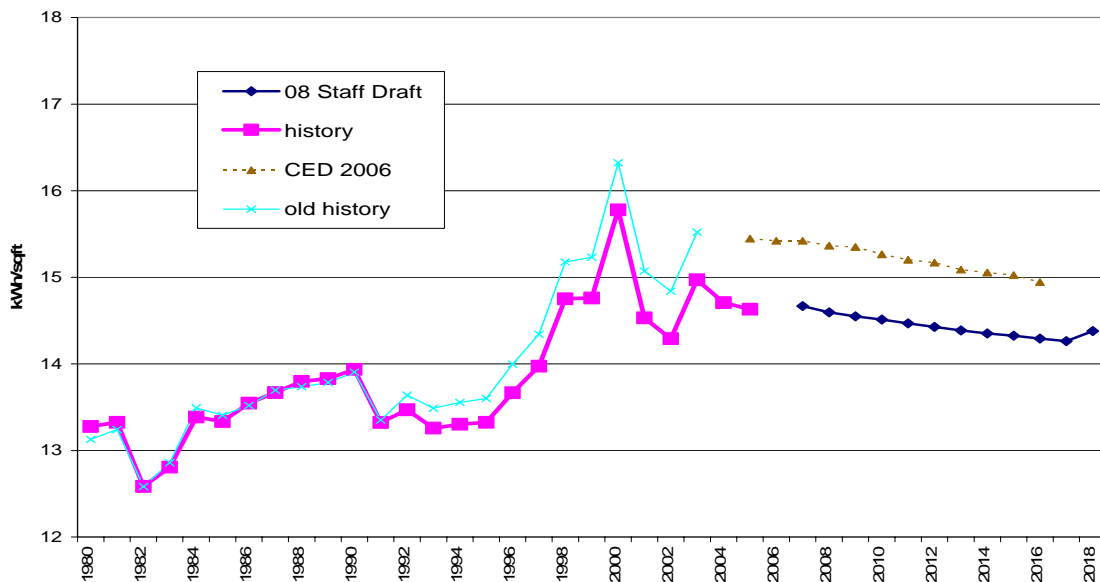
**Figure 3-14: SCE Planning Area Commercial Floor space**



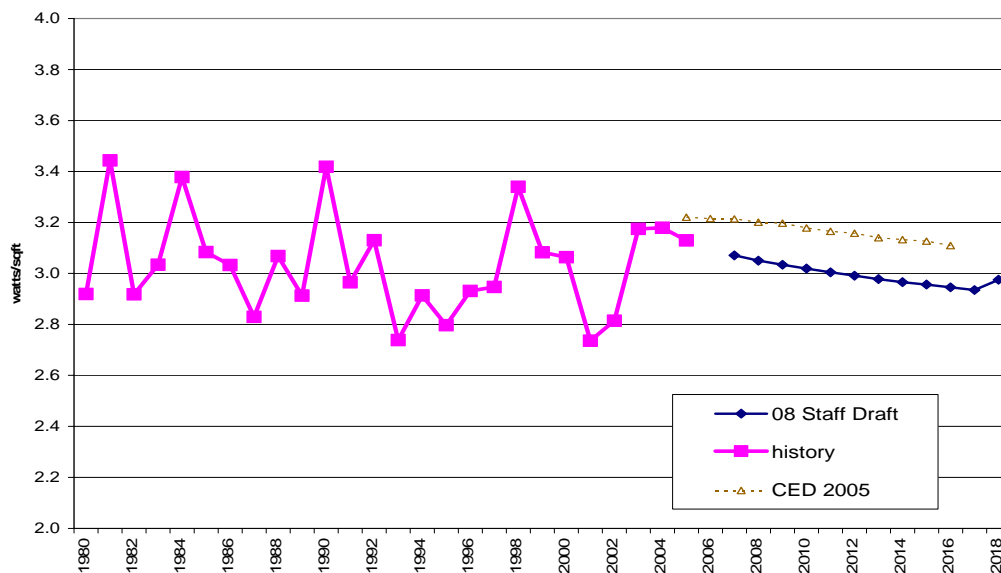
Figures 3-15 and 3-16 show historic and projected commercial sector annual and peak use per square foot, respectively. Figure 3-15 presents changes in annual use per square foot based on historic floor space estimates. Annual use per square foot declines over the forecast period at a slightly lower rate in the draft CED 2008 than in the CED 2006 forecast. The same is true for commercial peak use, as shown in Figure 3-16. The lower starting values, in both instances, result from revised estimates of historic use. Both the energy and peak forecasts decline over the forecast period due to projected impacts of commercial building and appliance standards.



**Figure 3-15: SCE Planning Area Commercial kWh per Square Foot**



**Figure 3-16: SCE Planning Area Commercial Watts per Square Foot**

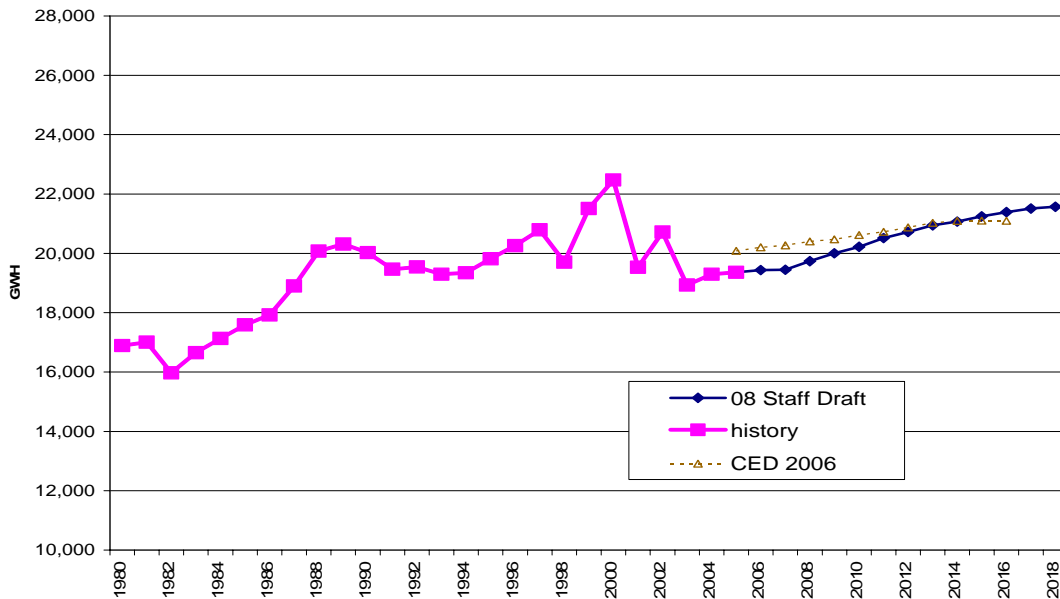


## Industrial Sector

Figure 3-17 provides comparisons of the forecasts' industrial sector electricity consumption for the SCE planning area. The draft CED 2008 forecast starts from a lower point than the CED 2006 forecast, but grows at a faster rate over the forecast period. The result is that the draft CED 2008 forecast is slightly higher at the end of the forecast period. The lower starting point is partly due to the reallocation of historic "unclassified" consumption into the industrial sector at a lower level than was done in the CED 2006 forecast. More optimistic projections of industrial growth

compared to those in the previous forecast, particularly in San Bernardino and Riverside, increase the growth rate. Figure 3-18 provides a comparison of the industrial sector peak forecasts. Re-estimation of the industrial sector peak causes the draft CED 2008 industrial sector peak to start at a higher value. Forecasted growth patterns are similar to those seen in the electricity consumption case.

**Figure 3-17: SCE Planning Area Industrial Consumption**



**Figure 3-18: SCE Planning Area Industrial Sector Peak**

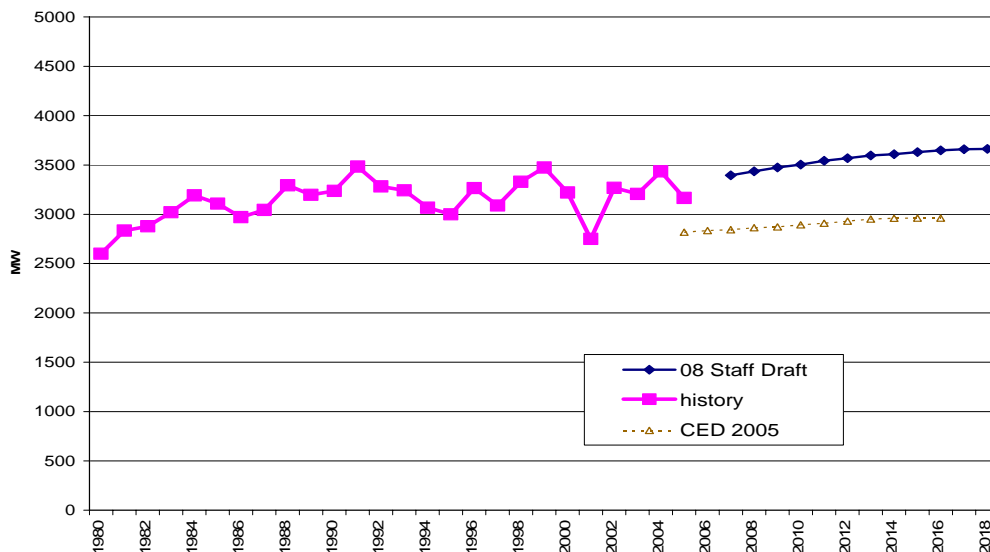
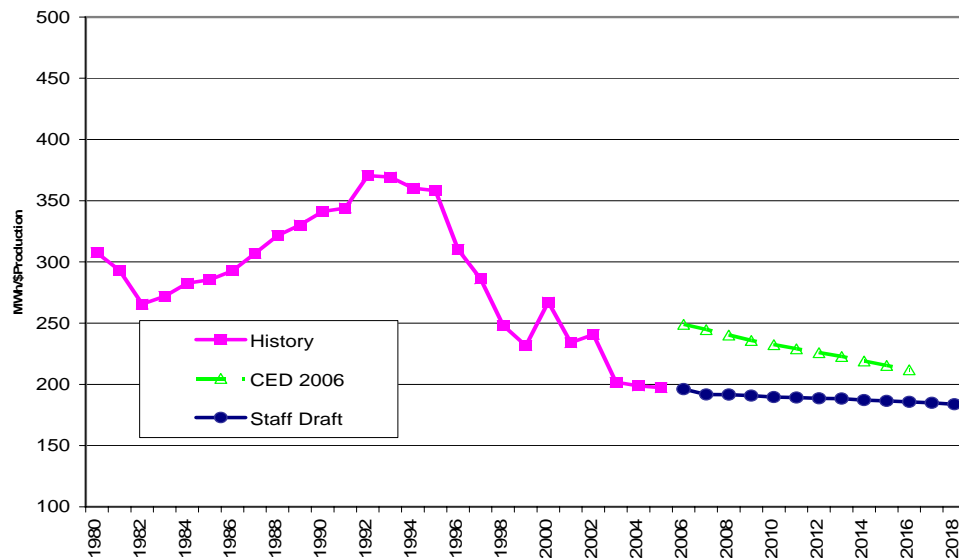


Figure 3-19 provides a comparison of electricity use per dollar of industrial production value between the draft CED 2008 and CED 2006 forecasts. The draft CED 2008 forecast is lower than the CED 2006 forecast due to a lower starting

value. The draft CED 2008 forecast declines slightly over the forecast period, continuing the recent historic pattern, but in contrast to the more rapid decline seen in the CED 2006 forecast.

**Figure 3-19: SCE Planning Area Industrial Use per Production Unit**



## Other Sectors

Figure 3-20 provides a comparison of the electricity consumption forecasts for the transportation, communication, and utilities and streetlighting sectors. The draft CED 2008 transportation, communication, and utilities and streetlighting forecast is higher than the CED 2006 forecast because of a higher starting point. The higher starting point is a result of assigning previously unclassified consumption to this sector based on more recent QFER filings. The growth rates of the two forecasts are very similar.

**Figure 3-20: SCE Planning Area Transportation, Communication, and Utilities and Streetlighting Sector Electricity Forecasts**

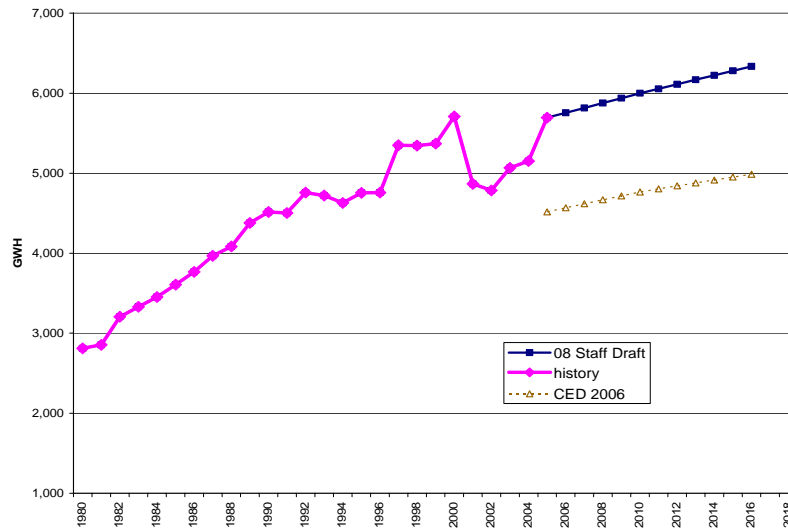


Figure 3-21 provides a comparison of the electricity consumption forecasts for the agriculture and water pumping and mining and oil extraction sectors. The draft CED 2008 agriculture and water pumping forecast is higher in the short to mid term than the CED 2006 forecast because of a higher starting point. The draft CED 2008 forecast growth rate is lower, resulting in a lower forecast at the end of the forecast period, due to a flatter trend in electricity used for urban water pumping. The draft CED 2008 mining and oil extraction sector forecast is higher than the CED 2006 forecast because of a slightly higher starting point. The higher starting point results in part from the reassignment of unclassified historic consumption into this sector. The draft CED 2008 forecast is projected to decline over the forecast period as economic output in that sector suffers a decline.

**Figure 3-21: SCE Planning Area Other Sector Electricity Forecasts  
(Agriculture & Water Pumping, Mining & Oil Extraction)**

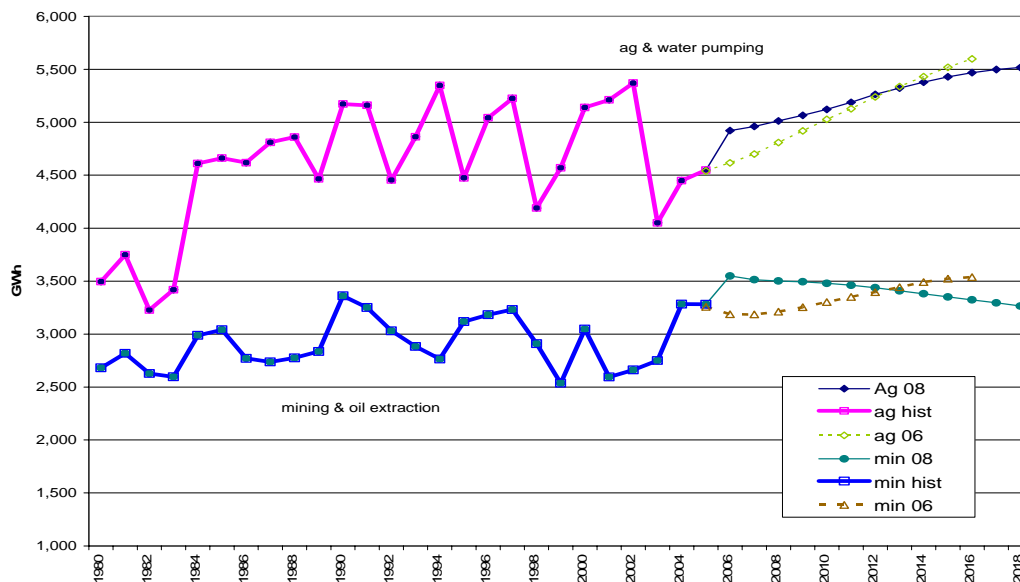
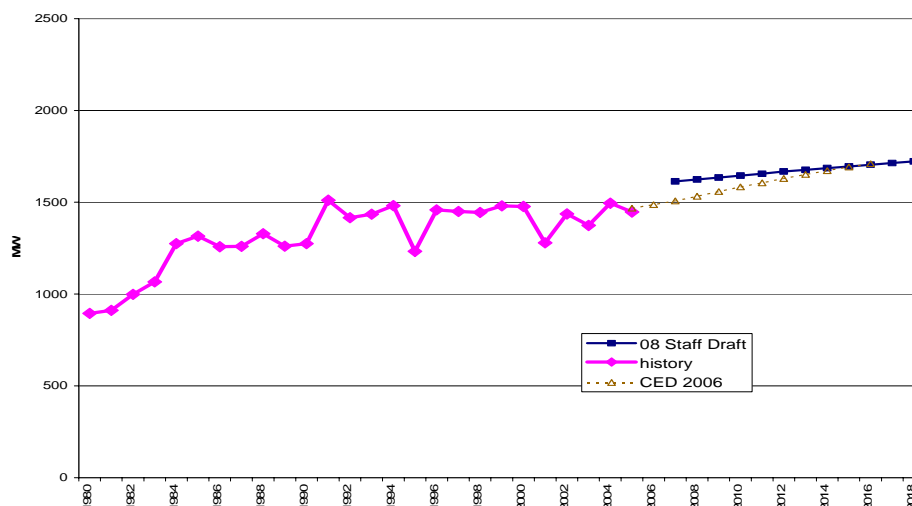


Figure 3-22 provides a comparison of the combined peak for these sectors between the two forecasts. A higher starting point raises the draft CEC 2008 forecast above CEC 2006, but the forecast grows at a slower rate than previously, so that the two forecasts are virtually the same by the end of the forecast period.

**Figure 3-22: SCE Planning Area Other Sector Peak**



## Electricity Prices

Pending the results of the forthcoming electricity price workshop, the draft CED 2008 forecast used prices which are held constant (in real terms) at the 2005 level for all

sectors. This is in contrast to the declining price forecast used in the CED 2006 price forecast.

## Self Generation

Table 3-23 shows the draft CED 2008 forecast of self-generation demand (excluding solar). Based on historic patterns of growth reported under the SGIP program, staff projects that about 24 MW per year of self-generation capacity will continue to be added. This declines after 2011 to the growth rate of the SCE area nonresidential sector.

Table 3-24 shows the projected impact of the CSI program. The rate of new installations is much lower than in the PG&E area, so the expected peak impact is only 70 MW by the end of the forecast. This represents about 150 MW of installed capacity.

**Figure 3-23: SCE Area Self-Generation Peak Demand Forecast**

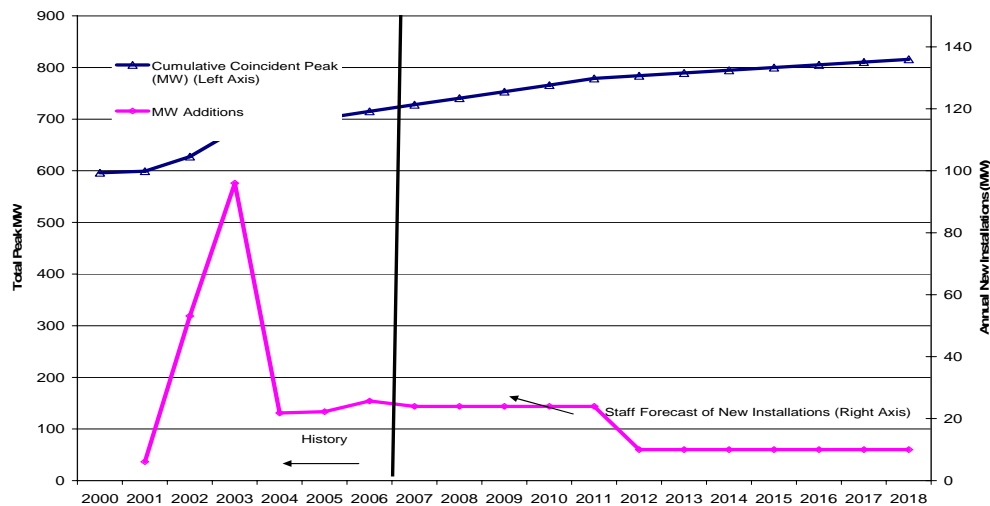
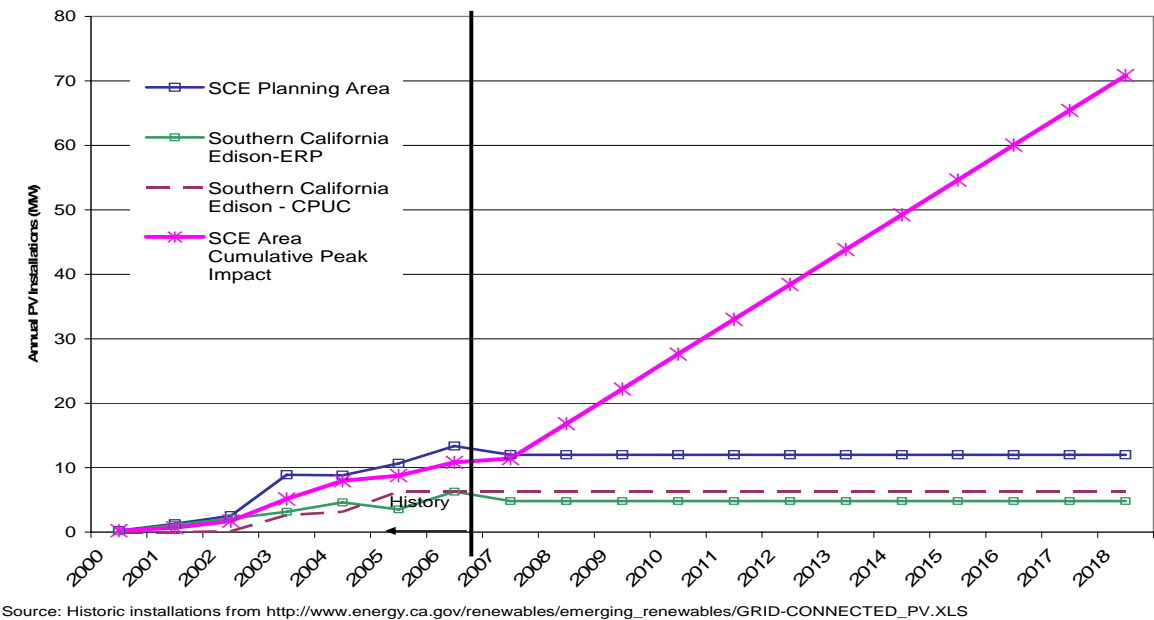


Figure 3-24: SCE Area CSI Peak Demand Forecast



**Form 1.1 - SCE Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Electricity Consumption by Sector (GWh)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	TCU	Streetlighting	Total Consumption
1980	16,965	16,799	16,893	2,681	3,496	2,174	637	59,644
1981	17,709	17,496	17,005	2,818	3,749	2,234	621	61,632
1982	17,389	17,085	15,971	2,628	3,226	2,499	707	59,504
1983	18,204	17,887	16,651	2,596	3,418	2,679	651	62,087
1984	19,395	19,126	17,131	2,988	4,611	2,835	618	66,704
1985	19,751	19,634	17,590	3,041	4,661	2,975	633	68,286
1986	19,877	20,678	17,925	2,771	4,618	3,148	618	69,635
1987	20,893	21,836	18,899	2,738	4,811	3,315	651	73,144
1988	22,124	22,927	20,072	2,776	4,861	3,490	595	76,843
1989	22,620	24,100	20,312	2,837	4,465	3,770	609	78,711
1990	23,684	25,308	20,028	3,361	5,173	3,884	632	82,069
1991	23,039	25,227	19,464	3,251	5,160	3,871	632	80,642
1992	24,210	26,398	19,539	3,031	4,456	4,080	678	82,392
1993	23,362	26,504	19,294	2,883	4,864	4,056	666	81,629
1994	24,190	26,916	19,347	2,765	5,348	3,969	659	83,195
1995	24,097	27,225	19,818	3,118	4,475	4,138	616	83,487
1996	24,738	28,219	20,257	3,183	5,042	4,125	633	86,197
1997	25,270	29,160	20,793	3,232	5,225	4,702	647	89,029
1998	25,749	31,220	19,705	2,910	4,191	4,669	677	89,120
1999	25,726	31,779	21,512	2,536	4,570	4,720	650	91,491
2000	27,980	34,797	22,476	3,047	5,140	5,035	674	99,148
2001	25,970	32,784	19,529	2,595	5,213	4,166	700	90,958
2002	26,577	33,112	20,715	2,662	5,369	4,079	706	93,222
2003	28,426	35,586	18,930	2,750	4,051	4,367	700	94,809
2004	29,463	35,628	19,294	3,283	4,448	4,447	704	97,267
2005	30,131	36,120	19,360	3,282	4,549	4,989	705	99,136
2006	31,448	37,305	19,439	3,549	4,844	5,046	710	102,339
2007	32,052	37,863	19,446	3,513	4,844	5,102	714	103,535
2008	32,663	38,477	19,739	3,501	4,850	5,158	718	105,106
2009	33,279	39,093	20,001	3,494	4,855	5,214	723	106,659
2010	33,866	39,658	20,222	3,480	4,858	5,272	727	108,082
2011	34,409	40,176	20,518	3,462	4,867	5,324	731	109,487
2012	34,926	40,712	20,720	3,438	4,883	5,377	734	110,791
2013	35,420	41,239	20,943	3,408	4,886	5,429	738	112,064
2014	35,915	41,755	21,072	3,380	4,888	5,482	741	113,234
2015	36,409	42,290	21,251	3,351	4,891	5,534	745	114,472
2016	36,900	42,785	21,392	3,323	4,893	5,587	748	115,627
2017	37,385	43,272	21,510	3,295	4,894	5,639	751	116,745
2018	37,866	44,256	21,572	3,266	4,895	5,692	754	118,300

**Annual Growth Rates (%)**

1980-1990	3.4	4.2	1.7	2.3	4.0	6.0	-0.1	3.2
1990-2000	1.7	3.2	1.2	-1.0	-0.1	2.6	0.7	1.9
2000-2005	1.5	0.7	-2.9	1.5	-2.4	-0.2	0.9	0.0
2005-2008	2.7	2.1	0.6	2.2	2.2	1.1	0.6	2.0
2008-2018	1.5	1.4	0.9	-0.7	0.1	1.0	0.5	1.2
2005-2018	1.8	1.6	0.8	0.0	0.6	1.0	0.5	1.4



**Form 1.1b - SCE Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Electricity Sales by Sector (GWh)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	TCU	Streetlighting	Total Consumption
1980	16,965	16,773	16,619	2,681	3,496	2,174	637	59,344
1981	17,709	17,470	16,729	2,818	3,749	2,231	621	61,327
1982	17,389	17,059	15,614	2,603	3,226	2,395	707	58,993
1983	18,204	17,789	15,952	2,572	3,418	2,564	651	61,150
1984	19,395	19,000	16,389	2,842	4,610	2,715	618	65,569
1985	19,751	19,488	16,743	2,853	4,661	2,853	633	66,981
1986	19,877	20,511	16,939	2,582	4,618	3,025	618	68,170
1987	20,893	21,599	17,647	2,547	4,807	3,172	651	71,317
1988	22,124	22,601	17,684	2,574	4,852	3,327	595	73,757
1989	22,620	23,727	17,816	2,628	4,455	3,605	609	75,460
1990	23,684	24,848	17,550	3,102	5,163	3,717	632	78,697
1991	23,039	24,753	16,980	2,960	5,150	3,699	632	77,213
1992	24,210	25,893	17,045	2,735	4,446	3,906	678	78,911
1993	23,362	25,965	16,724	2,662	4,851	3,802	666	78,032
1994	24,190	26,374	16,763	2,535	5,336	3,707	659	79,564
1995	24,097	26,675	17,204	2,871	4,463	3,872	616	79,799
1996	24,738	27,668	17,609	2,937	5,029	3,859	633	82,473
1997	25,270	28,586	17,970	2,972	5,213	4,424	647	85,082
1998	25,749	30,603	16,738	2,633	4,179	4,380	677	84,959
1999	25,726	31,141	18,476	2,239	4,570	4,419	650	87,220
2000	27,980	34,150	19,393	2,770	5,140	4,723	674	94,829
2001	25,970	32,675	16,820	1,605	5,213	3,968	700	86,951
2002	26,577	32,935	17,284	1,487	5,369	3,788	706	88,146
2003	28,426	35,395	15,374	1,481	4,051	4,012	700	89,438
2004	29,463	35,469	16,252	2,025	4,448	4,124	704	92,486
2005	30,131	35,969	16,301	2,029	4,549	4,692	705	94,377
2006	31,447	37,134	16,329	2,276	4,844	4,743	710	97,481
2007	32,049	37,655	16,289	2,220	4,844	4,794	714	98,565
2008	32,657	38,214	16,533	2,189	4,850	4,846	718	100,008
2009	33,270	38,758	16,748	2,162	4,855	4,898	723	101,413
2010	33,852	39,234	16,921	2,128	4,858	4,951	727	102,671
2011	34,390	39,645	17,169	2,091	4,867	4,998	731	103,891
2012	34,900	40,058	17,334	2,051	4,883	5,047	734	105,008
2013	35,387	40,444	17,520	2,007	4,886	5,096	738	106,078
2014	35,874	40,803	17,616	1,965	4,888	5,145	741	107,033
2015	36,359	41,161	17,760	1,922	4,891	5,194	745	108,032
2016	36,839	41,462	17,870	1,881	4,893	5,244	748	108,937
2017	37,313	41,738	17,958	1,841	4,894	5,293	751	109,789
2018	37,782	42,486	17,973	1,792	4,895	5,341	754	111,022

**Annual Growth Rates (%)**

1980-1990	3.4	4.0	0.5	1.5	4.0	5.5	-0.1	2.9
1990-2000	1.7	3.2	1.0	-1.1	0.0	2.4	0.7	1.9
2000-2005	1.5	1.0	-3.4	-6.0	-2.4	-0.1	0.9	-0.1
2005-2008	2.7	2.0	0.5	2.5	2.2	1.1	0.6	2.0
2008-2018	1.5	1.1	0.8	-2.0	0.1	1.0	0.5	1.1
2005-2018	1.8	1.3	0.8	-1.0	0.6	1.0	0.5	1.3

**Form 1.2 - SCE Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Net Energy for Load (GWh)**

	Total Consumption	Net Losses	Gross Generation	Private Supply	Net Energy for Load
1980	59,644	4,035	63,679	300	63,379
1981	61,632	4,170	65,802	305	65,497
1982	59,504	4,012	63,516	511	63,005
1983	62,087	4,158	66,245	937	65,308
1984	66,704	4,459	71,162	1,135	70,028
1985	68,286	4,555	72,840	1,304	71,536
1986	69,635	4,636	74,270	1,465	72,806
1987	73,144	4,850	77,993	1,827	76,166
1988	76,843	5,015	81,859	3,087	78,772
1989	78,711	5,131	83,843	3,251	80,591
1990	82,069	5,351	87,420	3,372	84,048
1991	80,642	5,251	85,893	3,429	82,464
1992	82,392	5,366	87,758	3,480	84,277
1993	81,629	5,306	86,935	3,597	83,338
1994	83,195	5,410	88,605	3,631	84,974
1995	83,487	5,426	88,914	3,689	85,225
1996	86,197	5,608	91,805	3,724	88,081
1997	89,029	5,786	94,815	3,948	90,867
1998	89,120	5,777	94,897	4,161	90,736
1999	91,491	5,931	97,422	4,271	93,151
2000	99,148	6,448	105,596	4,319	101,277
2001	90,958	5,913	96,871	4,007	92,864
2002	93,222	5,994	99,216	5,076	94,140
2003	94,809	6,082	100,891	5,371	95,520
2004	97,267	6,289	103,556	4,782	98,775
2005	99,136	6,418	105,554	4,760	100,794
2006	102,339	6,629	108,968	4,858	104,110
2007	103,535	6,702	110,237	4,970	105,268
2008	105,106	6,801	111,907	5,099	106,808
2009	106,659	6,896	113,555	5,246	108,309
2010	108,082	6,982	115,064	5,412	109,652
2011	109,487	7,065	116,551	5,596	110,955
2012	110,791	7,141	117,931	5,782	112,149
2013	112,064	7,213	119,278	5,986	113,291
2014	113,234	7,278	120,512	6,201	114,311
2015	114,472	7,346	121,818	6,440	115,378
2016	115,627	7,408	123,034	6,690	116,344
2017	116,745	7,466	124,211	6,956	117,255
2018	118,300	7,549	125,850	7,279	118,571

**Annual Growth Rates (%)**

1980-1990	3.2	2.9	3.2	27.4	2.9
1990-2000	1.9	1.9	1.9	2.5	1.9
2000-2005	0.0	-0.1	0.0	2.0	-0.1
2005-2008	2.0	2.0	2.0	2.3	2.0
2008-2018	1.2	1.1	1.2	3.6	1.1
2005-2018	1.4	1.3	1.4	3.3	1.3

**Form 1.3 - SCE Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Coincident Peak Demand by Sector (MW)**

Year	Residential	Commercial	Industrial	Agricultural	Other	Total Demand
1980	4,640	3,693	2,600	567	328	11,829
1981	4,326	4,521	2,834	573	338	12,592
1982	4,191	3,961	2,879	541	457	12,029
1983	4,342	4,237	3,021	572	494	12,666
1984	5,009	4,826	3,192	758	517	14,301
1985	4,809	4,541	3,107	787	529	13,773
1986	4,949	4,630	2,971	728	530	13,808
1987	5,207	4,521	3,045	718	542	14,032
1988	5,644	5,098	3,294	746	583	15,365
1989	5,530	5,077	3,198	695	565	15,065
1990	6,237	6,208	3,236	724	550	16,956
1991	5,485	5,614	3,483	831	681	16,093
1992	6,853	6,135	3,282	725	690	17,685
1993	5,749	5,474	3,243	750	686	15,903
1994	6,921	5,896	3,068	834	648	17,367
1995	6,958	5,715	3,000	646	587	16,906
1996	6,747	6,052	3,266	784	675	17,523
1997	7,728	6,149	3,088	744	705	18,415
1998	7,327	7,068	3,328	654	790	19,167
1999	6,827	6,637	3,474	699	782	18,418
2000	7,306	6,757	3,222	730	747	18,762
2001	7,026	6,173	2,750	716	563	17,229
2002	6,884	6,521	3,268	780	657	18,109
2003	7,403	7,547	3,207	630	744	19,530
2004	7,433	7,702	3,435	716	779	20,065
2005	8,866	7,726	3,166	696	751	21,204
2006	9,296	8,115	3,527	778	886	22,602
2007	9,135	7,928	3,395	750	864	22,071
2008	9,309	8,041	3,437	751	873	22,412
2009	9,485	8,153	3,474	752	883	22,747
2010	9,659	8,253	3,504	753	892	23,061
2011	9,829	8,345	3,544	754	901	23,373
2012	9,997	8,441	3,569	758	910	23,675
2013	10,163	8,536	3,596	758	919	23,973
2014	10,328	8,630	3,610	759	928	24,255
2015	10,494	8,728	3,631	759	936	24,548
2016	10,658	8,818	3,647	759	945	24,827
2017	10,820	8,906	3,659	759	954	25,099
2018	10,983	9,157	3,663	760	963	25,526

**Annual Growth Rates (%)**

1980-1990	3.0	5.3	2.2	2.5	5.3	3.7
1990-2000	1.6	0.9	0.0	0.1	3.1	1.0
2000-2005	3.9	2.7	-0.4	-0.9	0.1	2.5
2005-2008	1.6	1.3	2.8	2.6	5.2	1.9
2008-2018	1.7	1.3	0.6	0.1	1.0	1.3
2005-2018	1.7	1.3	1.1	0.7	1.9	1.4

**Form 1.4 - SCE Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Peak Demand (MW)**

Year	Total End Use Load	Net Losses	Gross Generation	Private Supply	Net Peak Demand	Load Factor (%)
1980	11,829	895	12,724	50	12,674	57.1
1981	12,592	953	13,545	51	13,494	55.4
1982	12,029	908	12,937	86	12,851	56.0
1983	12,666	951	13,617	157	13,460	55.4
1984	14,301	1,072	15,374	190	15,183	52.7
1985	13,773	1,030	14,803	219	14,584	56.0
1986	13,808	1,031	14,838	246	14,592	57.0
1987	14,032	1,043	15,075	307	14,768	58.9
1988	15,365	1,128	16,493	518	15,975	56.3
1989	15,065	1,103	16,168	546	15,622	58.9
1990	16,956	1,246	18,201	566	17,635	54.4
1991	16,093	1,179	17,273	576	16,697	56.4
1992	17,685	1,300	18,984	584	18,400	52.3
1993	15,903	1,163	17,065	604	16,461	57.8
1994	17,367	1,274	18,640	610	18,031	53.8
1995	16,906	1,238	18,144	619	17,524	55.5
1996	17,523	1,284	18,808	625	18,183	55.3
1997	18,415	1,349	19,764	663	19,101	54.3
1998	19,167	1,404	20,571	699	19,873	52.1
1999	18,418	1,345	19,763	717	19,046	55.8
2000	18,762	1,371	20,133	725	19,408	59.6
2001	17,229	1,258	18,487	673	17,814	59.5
2002	18,109	1,312	19,421	852	18,569	57.9
2003	19,530	1,416	20,946	902	20,044	54.4
2004	20,065	1,464	21,529	803	20,726	54.4
2005	21,204	1,551	22,755	799	21,956	52.4
2006	22,602	1,653	24,255	847	23,407	50.8
2007	22,071	1,611	23,682	876	22,806	52.7
2008	22,412	1,635	24,046	905	23,142	52.7
2009	22,747	1,658	24,405	933	23,472	52.7
2010	23,061	1,680	24,740	962	23,778	52.6
2011	23,373	1,701	25,075	990	24,084	52.6
2012	23,675	1,722	25,397	1,016	24,381	52.5
2013	23,973	1,743	25,715	1,042	24,674	52.4
2014	24,255	1,762	26,017	1,066	24,951	52.3
2015	24,548	1,783	26,331	1,091	25,240	52.2
2016	24,827	1,802	26,629	1,116	25,513	52.1
2017	25,099	1,821	26,920	1,139	25,781	51.9
2018	25,526	1,851	27,377	1,168	26,209	51.6

**Annual Growth Rates (%)**

1980-1990	3.7	3.4	3.6	27.4	3.4	-0.5
1990-2000	1.0	1.0	1.0	2.5	1.0	0.9
2000-2005	2.5	2.5	2.5	2.0	2.5	-2.5
2005-2008	1.9	1.8	1.9	4.2	1.8	0.2
2008-2018	1.3	1.3	1.3	2.6	1.3	-0.2
2005-2018	1.4	1.4	1.4	3.0	1.4	-0.1

**Form 1.7a - SCE**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Private Supply by Sector (GWh)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	TCU	Streetlighting	Total Consumption
1980	0	26	274	0	0	0	0	300
1981	0	26	277	0	0	3	0	305
1982	0	27	357	24	0	103	0	511
1983	0	99	698	24	1	115	0	937
1984	0	126	742	147	1	120	0	1,135
1985	0	147	847	188	1	122	0	1,304
1986	0	167	986	188	1	124	0	1,465
1987	0	237	1,252	191	4	143	0	1,827
1988	0	326	2,388	202	9	162	0	3,087
1989	0	373	2,495	209	9	165	0	3,251
1990	0	460	2,477	259	10	166	0	3,372
1991	0	474	2,484	291	10	171	0	3,429
1992	0	505	2,495	296	10	174	0	3,480
1993	0	539	2,570	222	13	254	0	3,597
1994	0	542	2,583	230	13	262	0	3,631
1995	0	550	2,614	247	13	266	0	3,689
1996	0	550	2,649	246	13	266	0	3,724
1997	0	574	2,823	260	13	278	0	3,948
1998	0	617	2,966	277	12	289	0	4,161
1999	0	638	3,036	297	0	301	0	4,271
2000	0	647	3,083	276	0	312	0	4,319
2001	0	109	2,709	991	0	198	0	4,007
2002	0	178	3,432	1,176	0	291	0	5,076
2003	0	191	3,556	1,270	0	355	0	5,371
2004	0	159	3,042	1,258	0	323	0	4,782
2005	0	150	3,059	1,253	0	298	0	4,760
2006	1	171	3,110	1,273	0	303	0	4,858
2007	3	209	3,158	1,293	0	308	0	4,970
2008	6	263	3,205	1,313	0	312	0	5,099
2009	9	335	3,253	1,332	0	317	0	5,246
2010	14	424	3,301	1,352	0	321	0	5,412
2011	19	531	3,348	1,371	0	326	0	5,596
2012	26	654	3,386	1,387	0	330	0	5,782
2013	33	795	3,423	1,402	0	333	0	5,986
2014	41	953	3,455	1,415	0	337	0	6,201
2015	50	1,129	3,490	1,429	0	340	0	6,440
2016	60	1,323	3,522	1,442	0	343	0	6,690
2017	72	1,533	3,551	1,454	0	346	0	6,956
2018	84	1,770	3,600	1,474	0	351	0	7,279

**Annual Growth Rates (%)**

1980-1990		33.3	24.6				27.4
1990-2000		3.5	2.2	0.7		6.5	2.5
2000-2005		-25.3	-0.2	35.3		-0.9	7.5
2005-2008		20.5	1.6	1.6		1.6	-1.0
2008-2018	31.2	21.0	1.2	1.2		1.2	3.5
2005-2018		20.9	1.3	1.3		1.3	1.7

**Form 2.2 - SCE**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Planning Area Economic and Demographic Assumptions**

Year	Population	Households	Persons per Household	Real Personal Income (1,000,000 2005\$)	Industrial Value Added (Millions 2005\$)
1980	8,366,390	2,989,881	2.80	76,967	12,902
1981	8,476,049	3,021,775	2.80	79,108	13,204
1982	8,604,473	3,042,087	2.83	79,005	12,795
1983	8,880,710	3,096,079	2.87	82,281	12,953
1984	9,189,678	3,172,075	2.90	90,024	13,620
1985	9,496,544	3,259,611	2.91	95,710	13,994
1986	9,880,725	3,373,196	2.93	101,422	14,184
1987	10,157,963	3,458,407	2.94	106,051	14,790
1988	10,439,494	3,556,992	2.93	110,392	15,557
1989	10,714,087	3,641,191	2.94	113,767	16,123
1990	10,871,278	3,682,527	2.95	116,379	16,469
1991	11,115,544	3,746,675	2.97	114,592	15,937
1992	11,318,871	3,787,989	2.99	116,484	15,878
1993	11,426,197	3,821,429	2.99	114,876	15,868
1994	11,518,356	3,851,515	2.99	115,659	15,791
1995	11,618,823	3,887,463	2.99	117,663	16,659
1996	11,714,175	3,918,728	2.99	120,930	16,411
1997	11,870,277	3,947,715	3.01	125,501	17,471
1998	12,014,581	3,980,466	3.02	134,208	17,603
1999	12,223,583	4,011,438	3.05	139,036	17,030
2000	12,455,827	4,033,738	3.09	146,217	17,401
2001	12,749,130	4,074,054	3.13	151,156	15,249
2002	13,010,213	4,115,970	3.16	153,608	14,711
2003	13,267,848	4,164,606	3.19	157,512	14,289
2004	13,497,379	4,219,380	3.20	164,982	15,022
2005	13,697,573	4,283,046	3.20	170,057	15,308
2006	13,852,159	4,322,887	3.20	176,241	15,553
2007	14,006,644	4,362,501	3.21	182,260	15,731
2008	14,160,952	4,401,850	3.22	188,308	16,000
2009	14,315,087	4,440,953	3.22	194,357	16,215
2010	14,473,209	4,481,142	3.23	199,897	16,364
2011	14,617,404	4,516,611	3.24	204,941	16,562
2012	14,761,542	4,551,874	3.24	209,572	16,660
2013	14,905,640	4,586,936	3.25	213,844	16,794
2014	15,049,685	4,621,796	3.26	218,060	16,837
2015	15,193,676	4,656,457	3.26	222,200	16,930
2016	15,337,612	4,690,911	3.27	226,266	16,996
2017	15,481,491	4,725,167	3.28	230,212	17,050
2018	15,625,329	4,759,228	3.28	234,044	17,056

**Annual Growth Rates (%)**

1980-1990	2.7	2.1	0.5	4.2	2.5
1990-2000	1.4	0.9	0.5	2.3	0.6
2000-2005	1.9	1.2	0.7	3.1	-2.5
2005-2008	1.1	0.9	0.2	3.5	1.5
2008-2018	1.0	0.8	0.2	2.2	0.6
2005-2018	1.0	0.8	0.2	2.5	0.8

# CHAPTER 4: SAN DIEGO GAS & ELECTRIC PLANNING AREA

The San Diego Gas & Electric planning area includes (1) SDG&E bundled retail customers, (2) customers served by various energy service providers (ESPs) using the SDG&E distribution system to deliver electricity to endusers, and (3) customers served by the City of Escondido.

This chapter is organized in a fashion similar to those for the other planning areas. First, forecasts of total and per capita consumption and peak loads for the planning area are presented. For perspective, CED 2008 draft forecast values are compared to those in the CED 2006 forecast. The forecasted load factor, jointly determined by the consumption and peak load estimates, is also discussed. Then, sector consumption and peak load forecasts are presented and compared to the sector level CED 2006 forecast values.

## Forecast Results

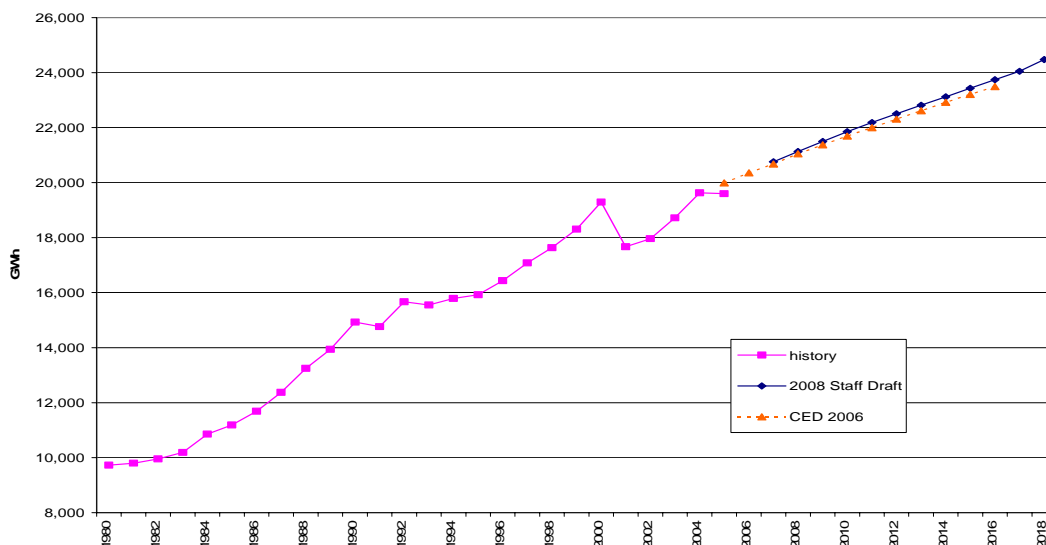
Table 4-1 presents a comparison of the planning area electricity consumption and peak demand forecasts for selected years.

**Table 4-1: SDG&E Planning Area Forecast Comparison**

	Consumption (GWH)			Peak (MW)		
	CED 2006	Staff Draft	Percent Difference Staff Draft/CED 2006	CED 2006	Staff Draft	Percent Difference Staff Draft/CED 2006
1990	14,926	14,926	0.00%	2,961	2,949	-0.39%
2000	19,295	19,295	0.00%	3,472	3,471	-0.02%
2005	19,988	19,595	-1.97%	4,231	4,052	-4.24%
2008	21,051	21,130	0.37%	4,451	4,578	2.85%
2013	22,614	22,812	0.87%	4,784	4,899	2.42%
2016	23,490	23,742	1.08%	4,970	5,084	2.30%
Annual Average Growth Rates						
1990-2000	2.60%	2.60%		1.60%	1.64%	
2000-2005	0.71%	0.31%		4.03%	3.14%	
2005-2008	1.74%	2.55%		1.70%	4.15%	
2008-2016	1.38%	1.47%		1.39%	1.32%	
Historic values are shaded						

As shown in Figure 4-1, the draft consumption forecast is about 1 percent higher than CED 2006 by the end of the forecast horizon, primarily because of higher growth rates in the commercial sector.

**Figure 4-1: SDG&E Planning Area Electricity Forecast**



The draft CED 2008 SDG&E planning area peak demand forecast is about 2.5 percent higher over the entire forecast period than its CED 2006 counterpart. The primary reason for the increase is that the actual weather-adjusted 2005 and 2006 peaks were greater than what was projected in the CED 2006 forecast, as documented in the recent peak demand forecast updates. The forecasted growth rate of peak demand is slightly higher than in the CED 2006 forecast.

**Figure 4-2: SDG&E Planning Area Peak**

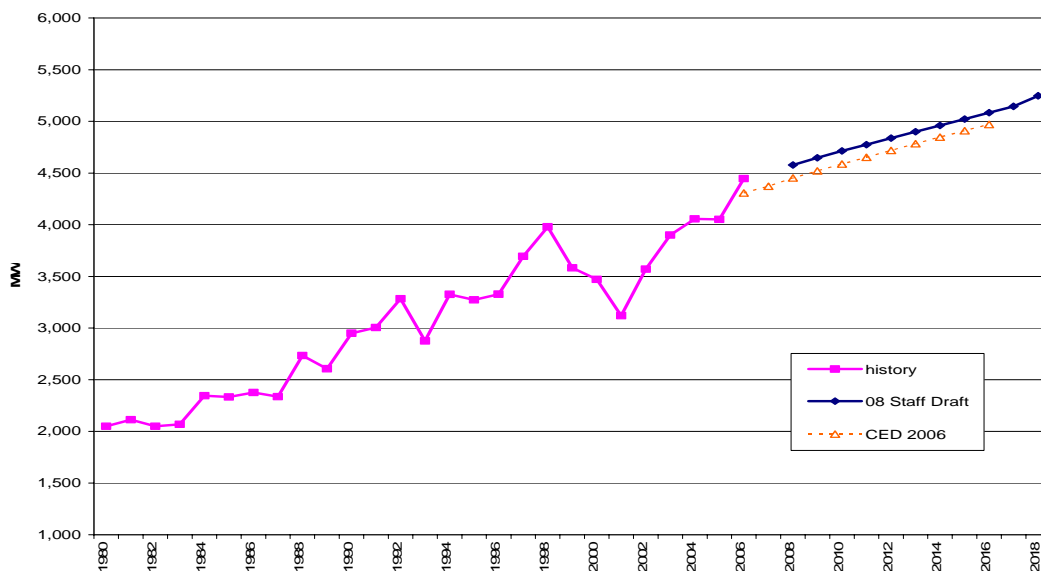
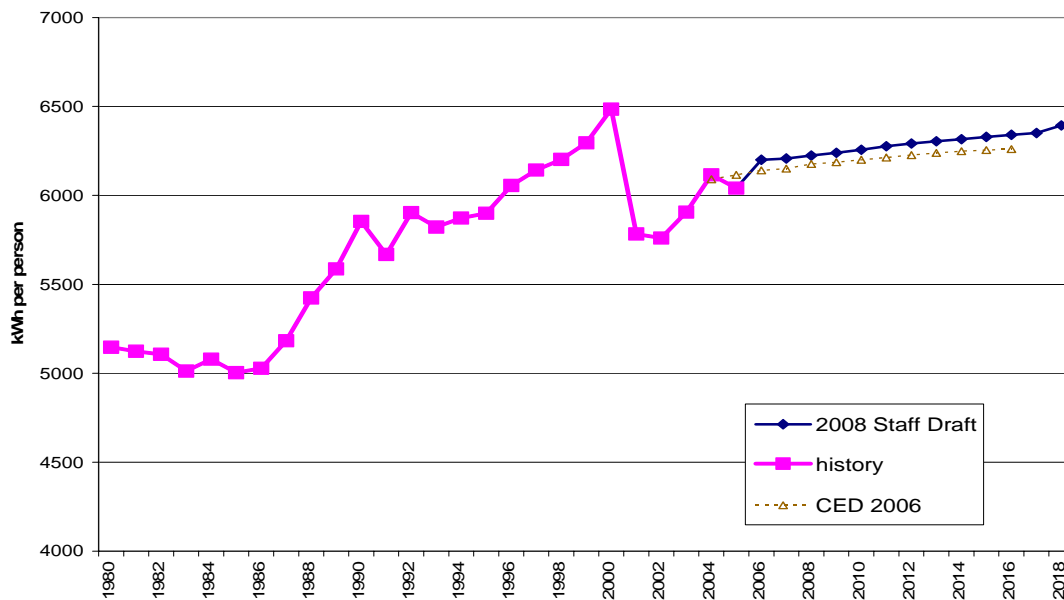




Figure 4-3 compares forecasted per capita residential electricity consumption. Per capita consumption in the CED 2008 draft forecast is slightly higher in the long term than projected in the CED 2006 forecast, due in large part to a decrease in persons-per-household. The projected growth in households is greater for the CED 2008, while the population growth rate is nearly identical.

**Figure 4-3: SDG&E Planning Area per Capita Electricity Consumption**



Per capita peak demand, shown in Figure 4-4, is higher by a constant amount over the entire forecast period because of higher than expected peak demand in 2005 and 2006. Adjusting for this change in the starting point, the two projections of per capita peak demand are similar throughout the forecast period and below pre-electricity crisis levels.

**Figure 4-4: SDG&E Planning Area per Capita Peak Demand**

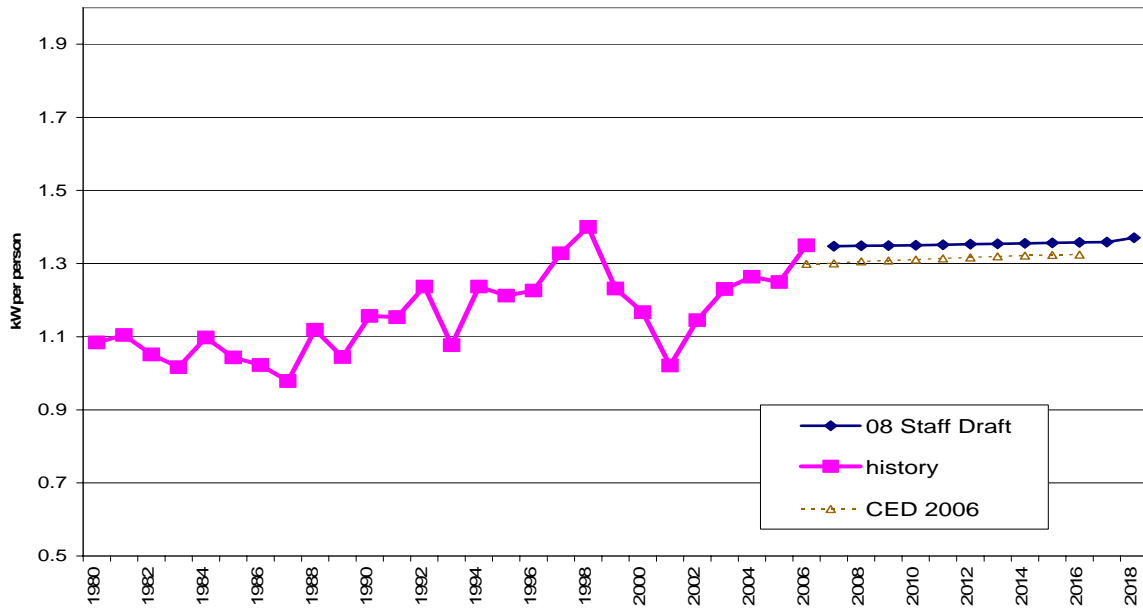
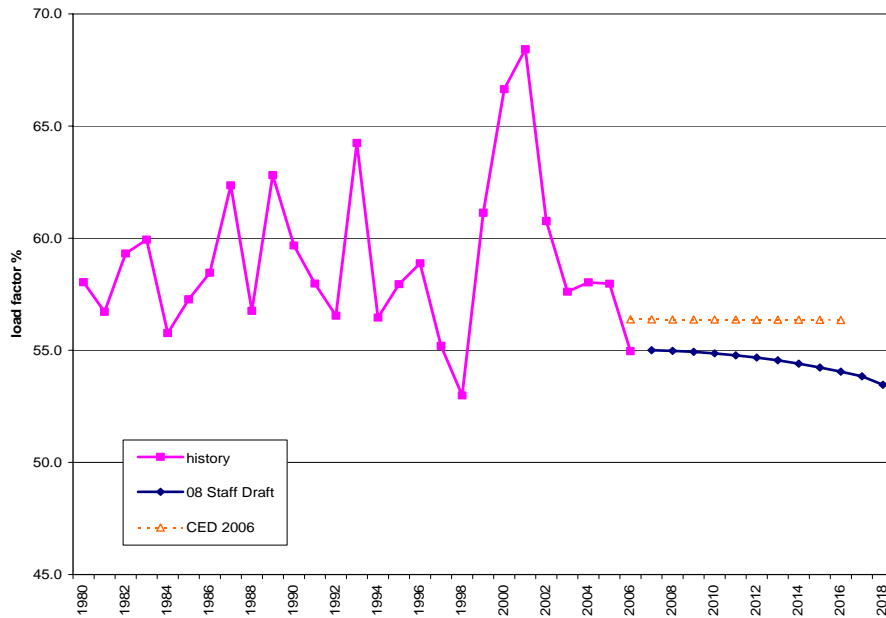


Figure 4-5 provides a comparison of the respective forecast load factors. High load factors observed from 1998-2005 are a product of lower-than-average peak temperatures and reaction to the energy crisis. The projected load factor, based on higher, 1-in-2 peak temperatures, and a return to normal air conditioning use patterns, should be lower than these recent values. The forecasted load factor declines slightly, reflecting an increase in air conditioning use in the SDG&E territory.

**Figure 4-5: SDG&E Planning Area Peak Load Factor**



## Sector Level Results and Input Assumptions

### *Residential*

Figure 4-6 provides a comparison between the CED 2008 draft and CED 2006 SDG&E planning area residential forecasts. Higher projected growth rates for both households and income cause the CED 2008 draft to be slightly higher than the CED 2006 due. For the draft CED 2008 income grows faster than population, which leads to an increase in household income greater than that of CED 2006.

**Figure 4-6: SDG&E Planning Area Residential Consumption**

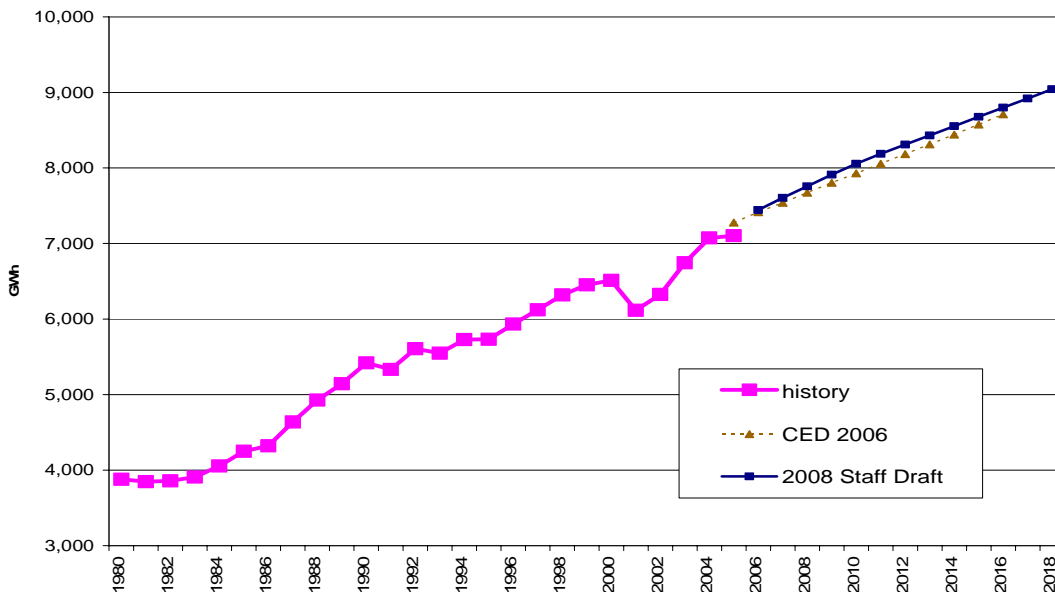
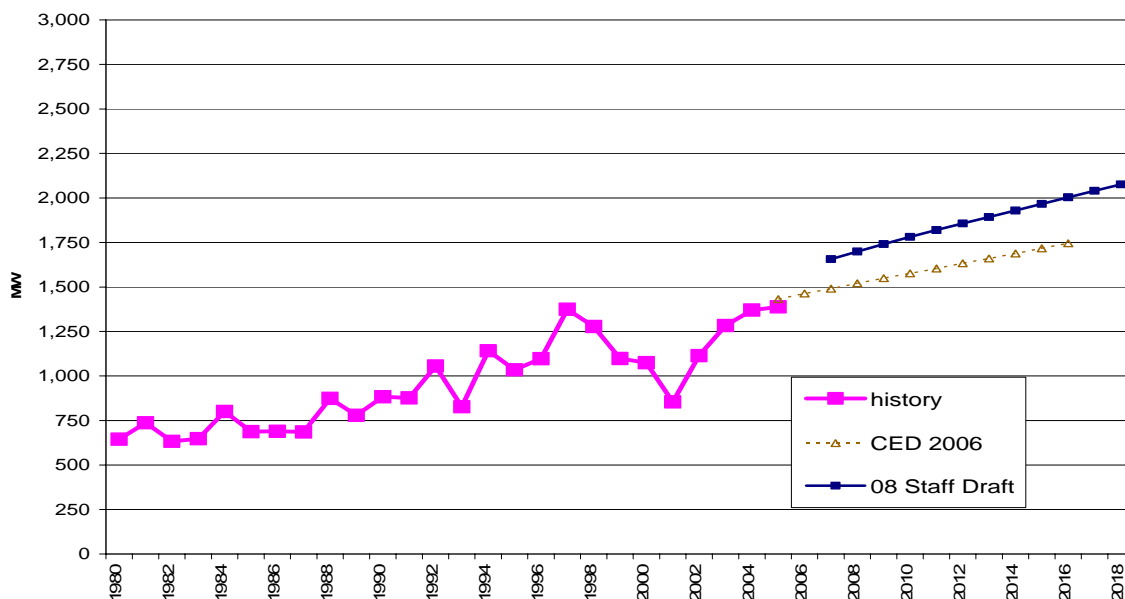


Figure 4-7 provides a comparison of the draft CED 2008 and CED 2006 residential peak demand forecasts. The draft forecast is higher because of increased saturation of air conditioning and a higher actual starting point. The forecasted growth rates of the draft forecast is slightly higher because of higher growth in personal income.

**Figure 4-7: SDG&E Planning Area Residential Peak**



Figures 4-8 and 4-9 provide comparisons of the residential drivers used in the CED 2008 draft forecast with those used in CED 2006. Figure 4-8 provides comparisons of total population, total households, and persons per household projections. The forecast of total population is essentially unchanged, but because recent estimates of persons per household have been declining, the total number of projected households is lower.

**Figure 4- 8: SDG&E Planning Area Residential Demographic Projections**

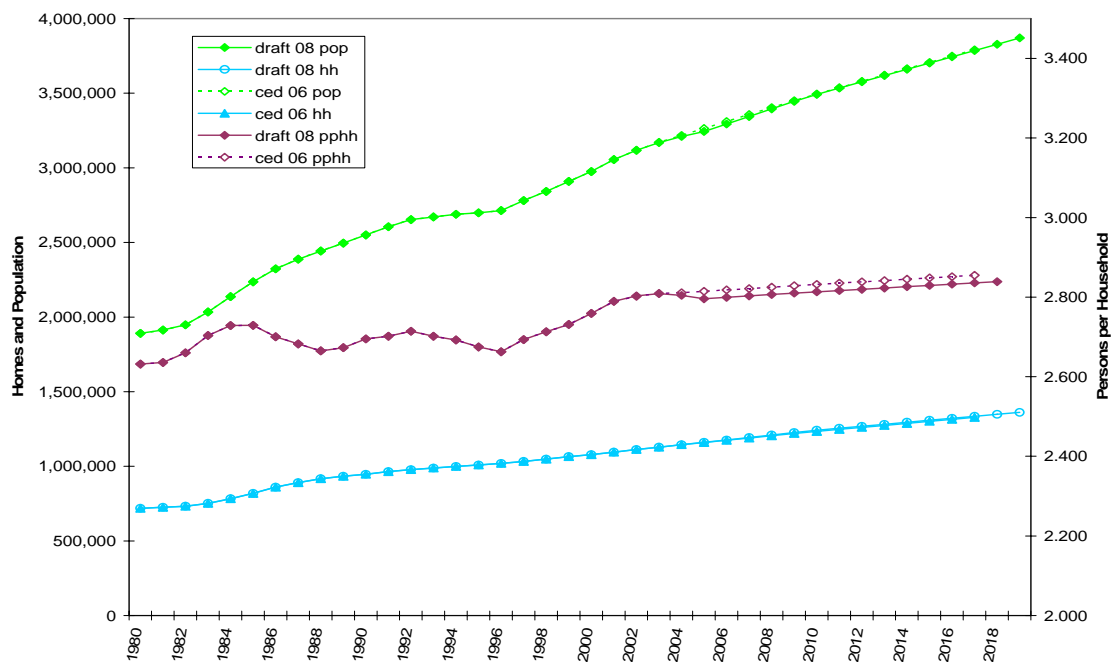
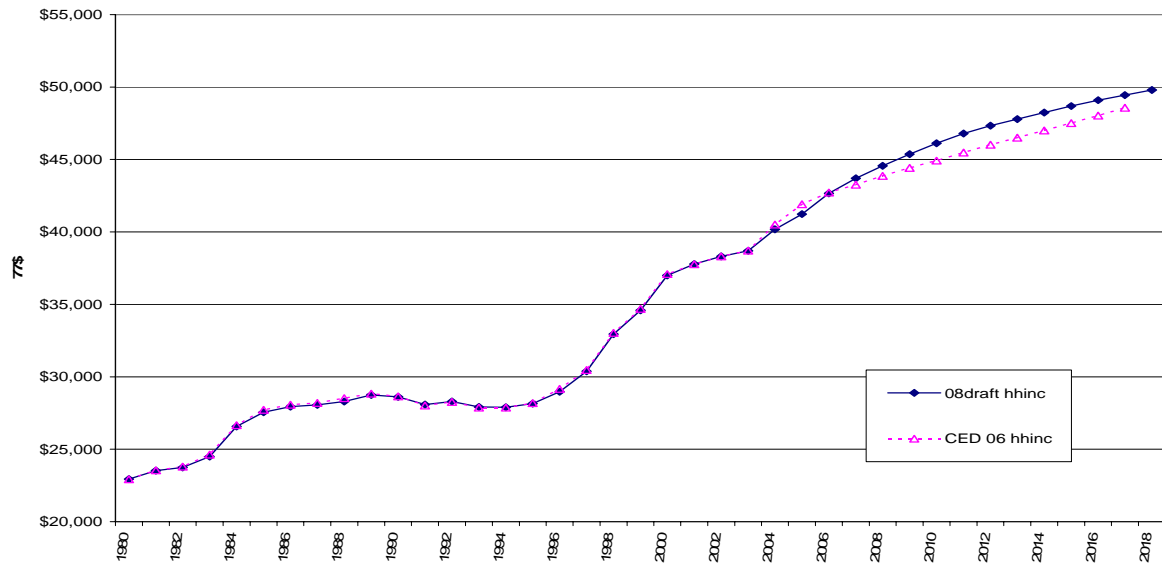


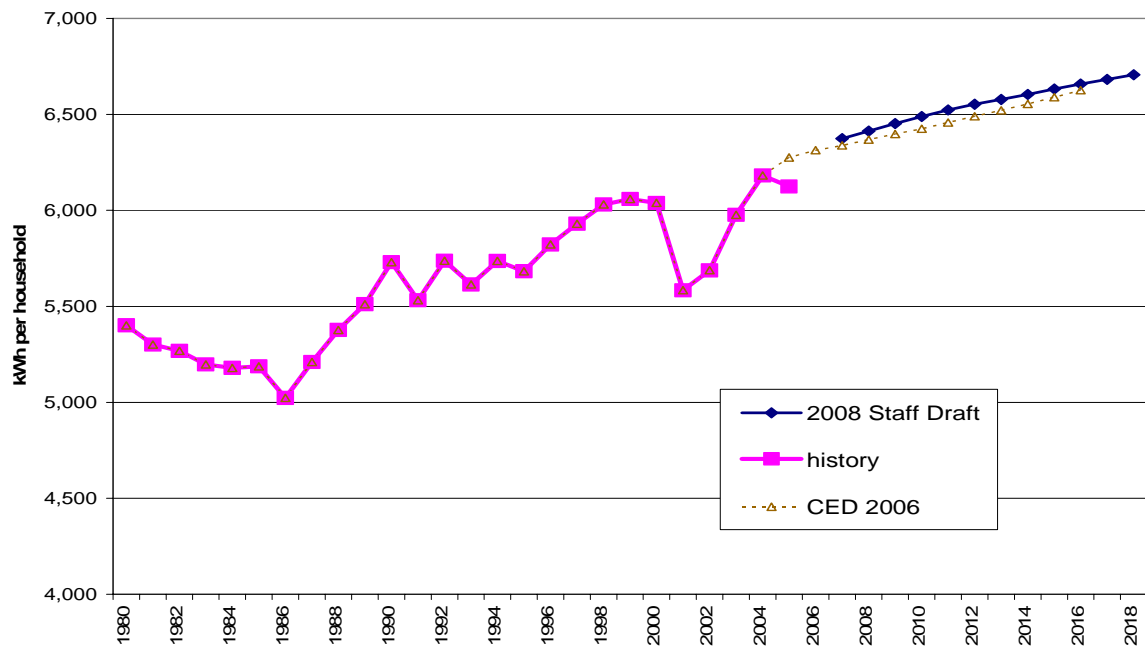
Figure 4-9 provides a comparison of household income between the two forecasts. The CED 2008 projection, using a more recent forecast from Economy.com, is higher in the short- to mid-term. In the longer term, CED 2008 forecasted household income growth slows but is still higher than in CED 2006.

**Figure 4-9: SDG&E Planning Area Household Income Projections**

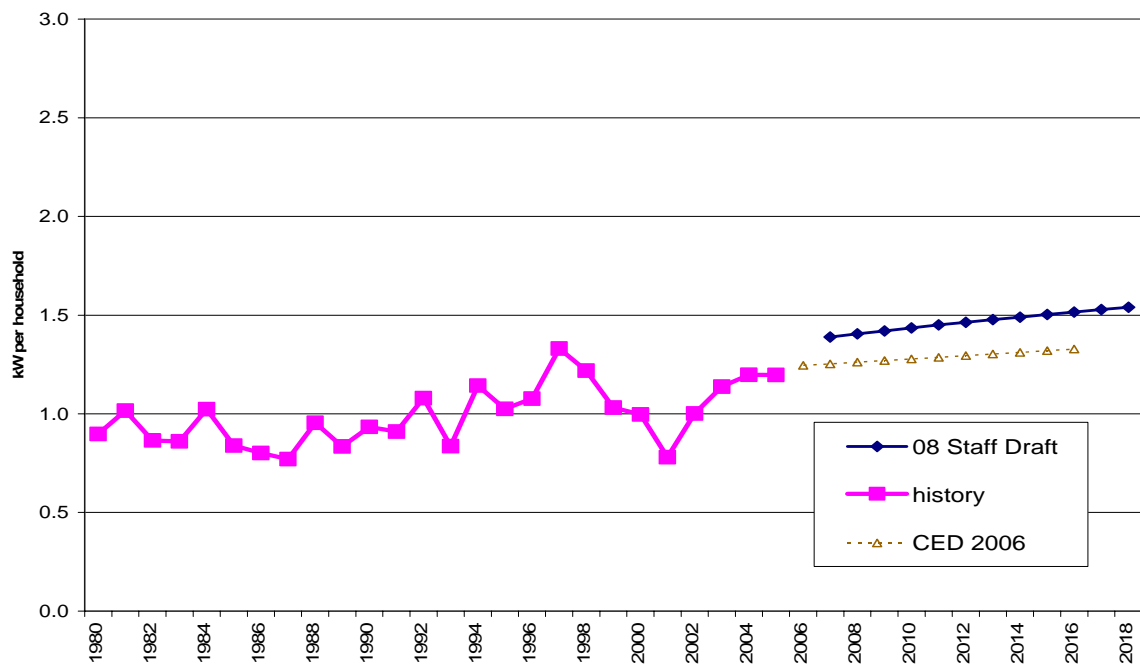


Figures 4-10 and 4-11 present comparisons of use per household between the two forecasts. Figure 4-10 is a comparison of annual electricity use per household and Figure 4-11 is a comparison of peak demand per household. The draft CED 2008 forecast of use per household is somewhat higher than that projected in CED 2006. This is primarily due to higher short-term household income growth projections. Staff is currently in the process of analyzing recently submitted 2006 QFER data in order to verify this higher starting value. The forecasted growth rate for use per household is similar in both forecasts. Differences in peak use per household are consistent with the annual peak forecast update in 2007 which increased the SDG&E planning area 2007 peak forecast.

**Figure 4-10: SDG&E Planning Area Use per Household**



**Figure 4-11: SDG&E Planning Area Peak Use per Household**



### ***Commercial Building Sector***

Figures 4-12 and 4-13 provide a comparison of the commercial building sector forecasts. In Figure 4-12, the CED 2008 staff draft consumption forecast is higher

than its CED 2006 counterpart, due primarily to a higher weather-adjusting starting point. The growth rates of both forecasts are similar.

**Figure 4-12: SDG&E Planning Area Commercial Consumption**

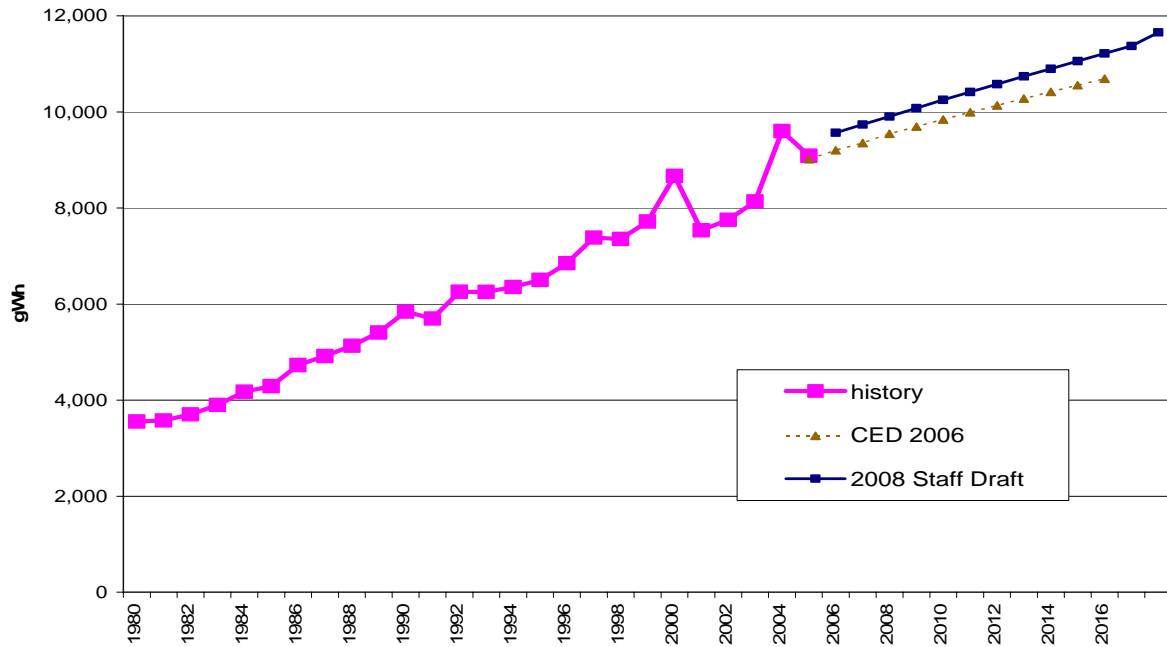
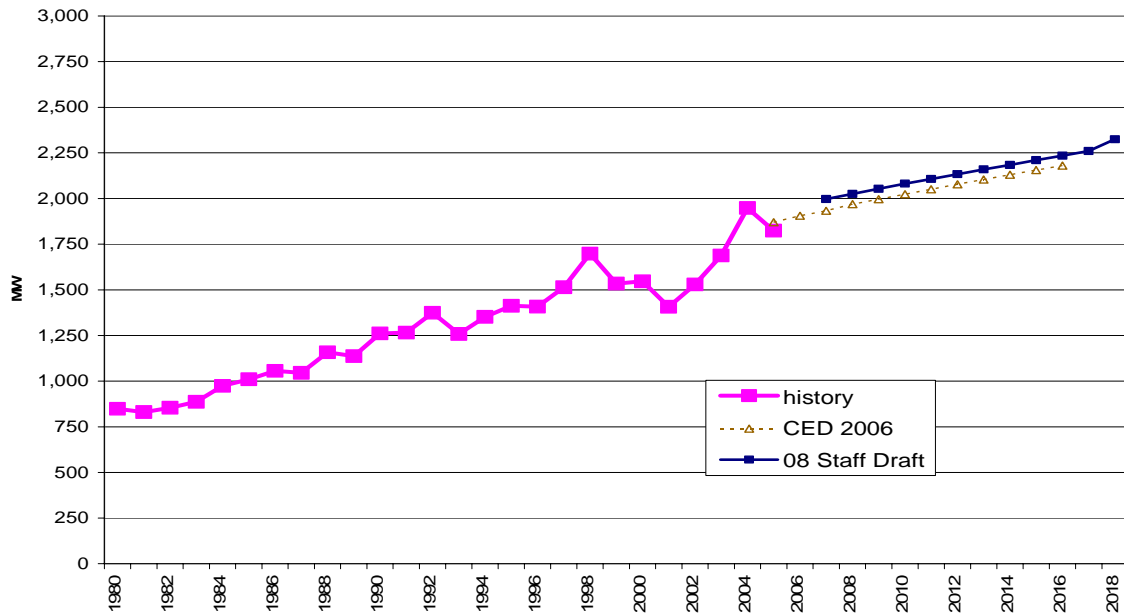


Figure 4-13 provides a comparison of the commercial building sector peak demand forecasts. A higher starting value makes the CED 2006 forecast higher throughout the forecast period. The growth rates in the two forecasts are very similar.

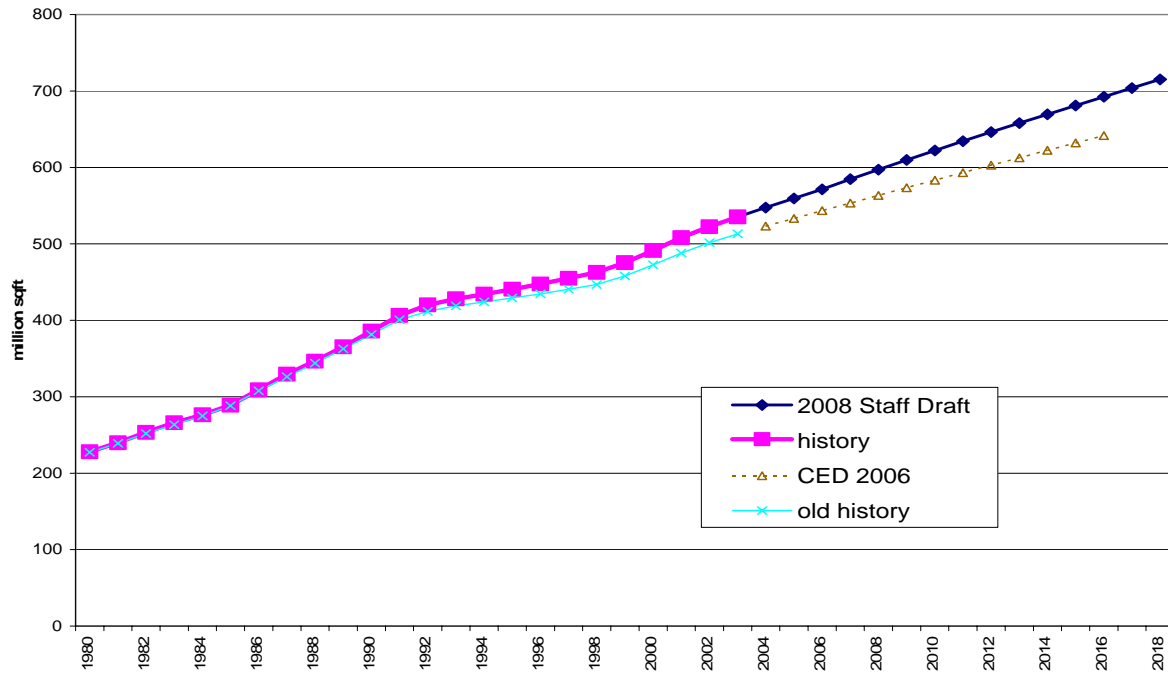


**Figure 4-13: SDG&E Planning Area Commercial Sector Peak**



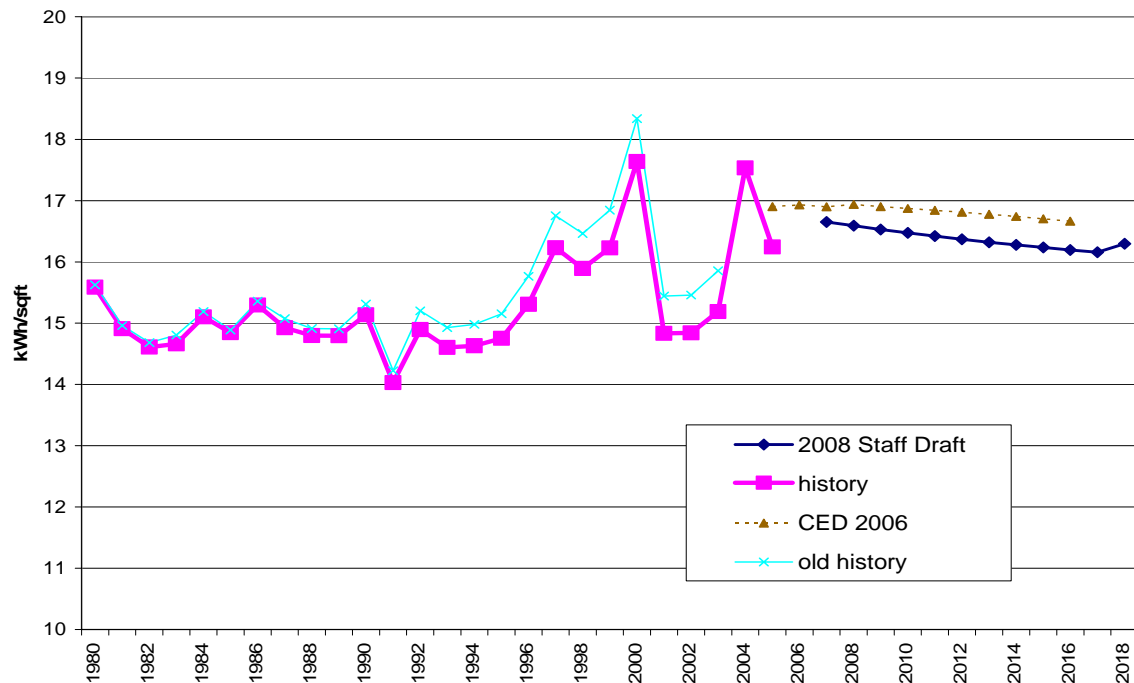
In staff's commercial building sector forecasting model, floor space by building type (e.g. retail, schools, offices, etc.) is the key driver of energy use for each specific building type. Figure 4-14 provides a comparison of total commercial floor space projections. The difference between the CED 2008 staff draft and the CED 2006 floor space forecasts, including the back-cast period of the 1990s, is primarily because of the change in floor space estimation techniques.

**Figure 4-14: SDG&E Planning Area Commercial Floor Space**

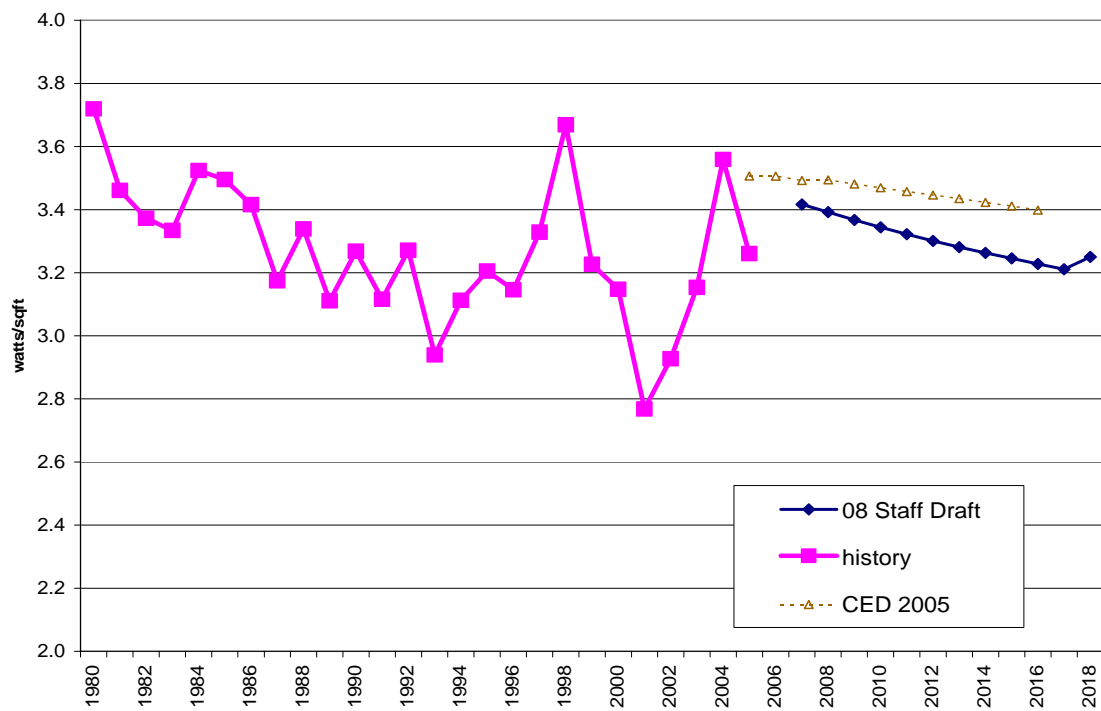


Historic and projected commercial sector annual and peak use per square foot are shown in Figures 4-15 and 4-16, respectively. Changes in annual use per square foot are based on the historic floor space estimates presented in Figure 4-15. The draft CED 2008 annual use per square foot declines over the forecast period at a slightly lower rate than the CED 2006 forecast as does commercial peak use (Figure 4-16). Revised estimates of historic floor space trigger the lower starting values in both instances. Both the energy and peak forecasts decline over the forecast period because of projected commercial building and appliance standards impacts.

**Figure 4-15: SDG&E Planning Area Commercial kWh per Square Foot**



**Figure 4-16: SDG&E Planning Area Commercial Watts per Square Foot**



## Industrial Sector

Figure 4-17 provides a comparison of the industrial sector electricity consumption forecasts for the SDG&E planning area. The CED 2008 staff draft forecast is higher throughout the entire forecast period primarily because the CED 2008 staff draft has a higher starting point. This is because 2005 actual industrial consumption was higher than the CED 2006 estimate for 2005. The growth rates of both forecasts are very similar through 2016. The difference in the starting points is also a result of staff's revised method of allocating unclassified energy consumption to the various non-residential sectors.

**Figure 4-17: SDG&E Planning Area Industrial Consumption**

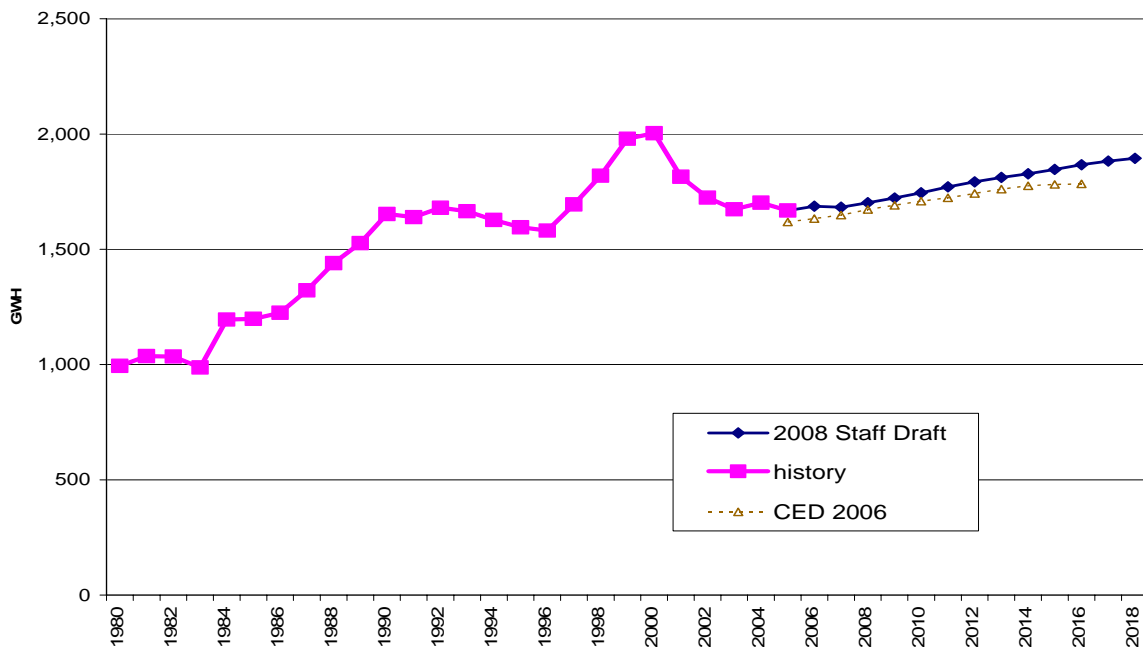


Figure 4-18 provides a comparison of the industrial sector peak forecasts. The draft CED 2008 peak is higher throughout the forecast period as a result of a higher starting value. As was the case for industrial sector consumption, the projected growth rate of peak demand is slightly higher than that projected in CED 2006.

**Figure 4-18: SDG&E Planning Area Industrial Sector Peak**

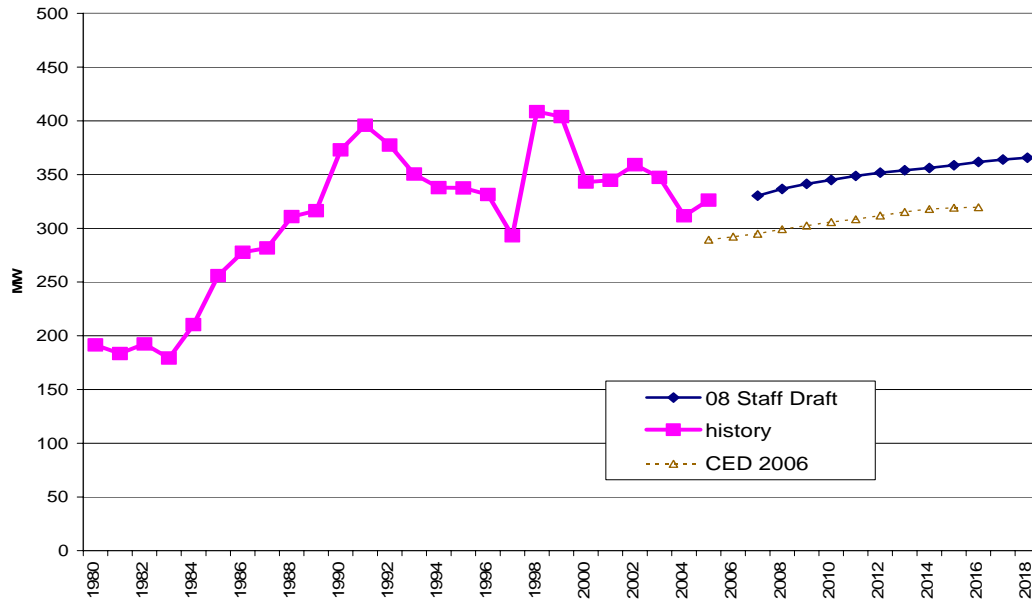
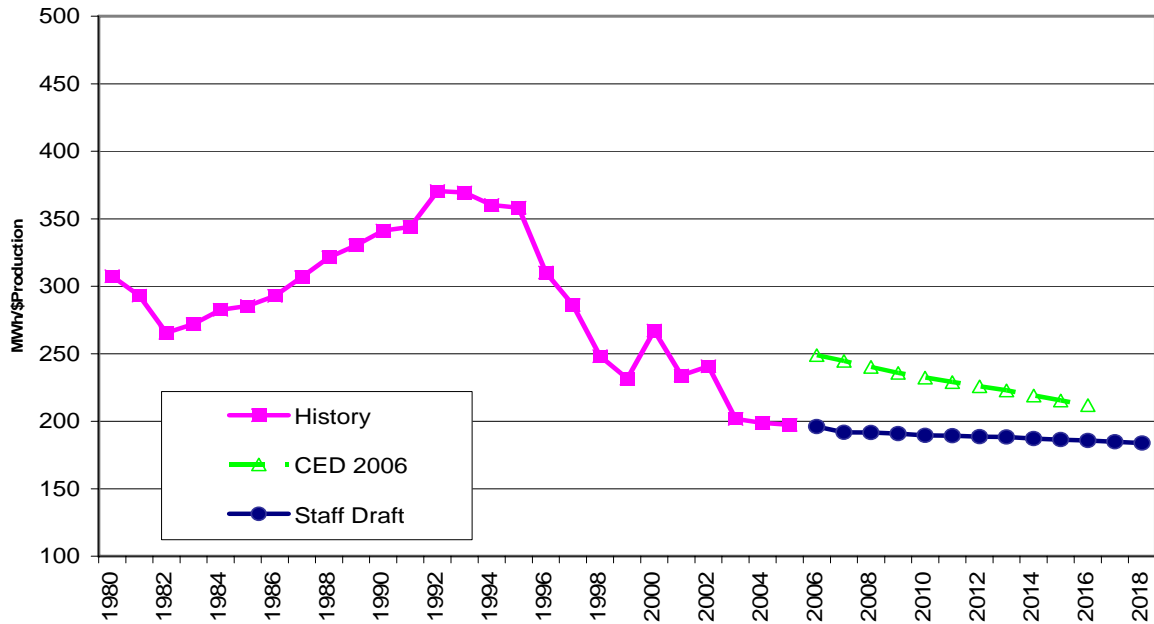


Figure 4-19 provides a comparison of use per dollar value of production between the CED 2008 staff draft and CED 2006 forecasts. The difference in kWh per dollar of industrial value added in the CED 2008 staff draft and CED 2006 industrial forecasts, especially in the early years, is caused by different starting points. These points differ as a result of the unclassified electricity sales distribution process that must occur in every forecast cycle. Also, Economy.com has revised the historic industrial production data used for the forecast.

**Figure 4-19: SDG&E Planning Area Industrial Use per Production Unit**

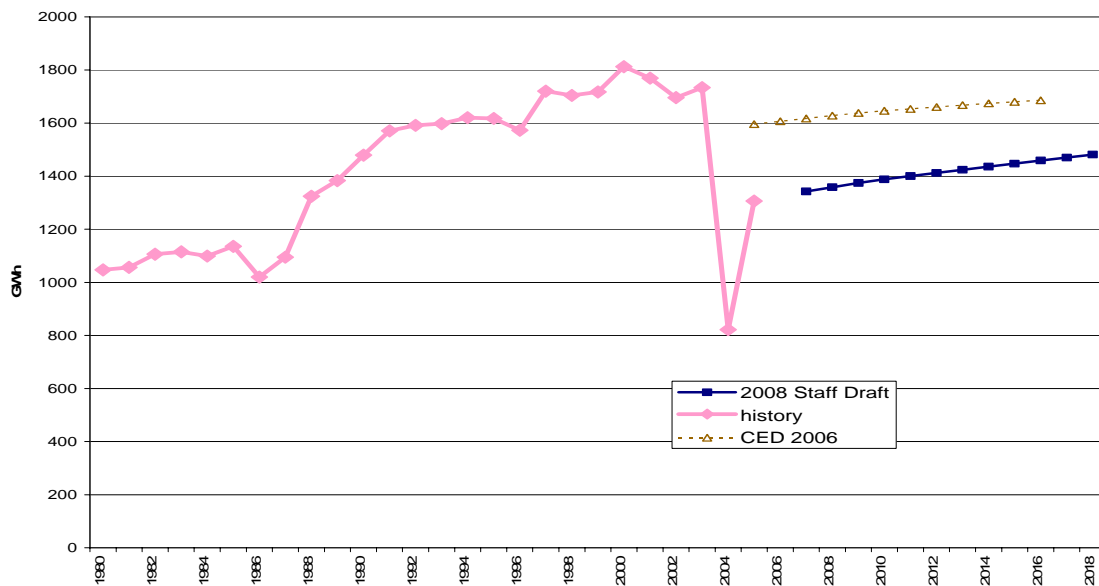


### Other Sectors

Figures 4-20 and 4-21 provide comparisons of the remaining sector electricity consumption forecasts. Figure 4-20 provides a comparison of the transportation, communication and utilities (TCU) sector forecasts. The CED 2008 staff draft forecast is lower than the CED 2006 forecast because of a lower historic starting point.

Figure 4-21 provides comparisons of the agriculture and water pumping and mining and oil extraction sector forecasts. The CED 2008 staff draft agriculture and water pumping forecast is lower than the CED 2006 because of higher projected electricity rates. The CED 2006 mining and oil extraction forecast has a higher starting point because of changes in the unclassified consumption distribution. The lower growth rate of the draft forecast reflects the pattern of Economy.com's forecast of mining sector employment, which is used as the forecast driver.

**Figure 4-20: SDG&E Planning Area Transportation, Communication & Utilities Sector Electricity Consumption**



**Figure 4-21: SDG&E Planning Area Agriculture & Water Pumping and Mining & Oil Extraction Electricity Consumption Forecasts**

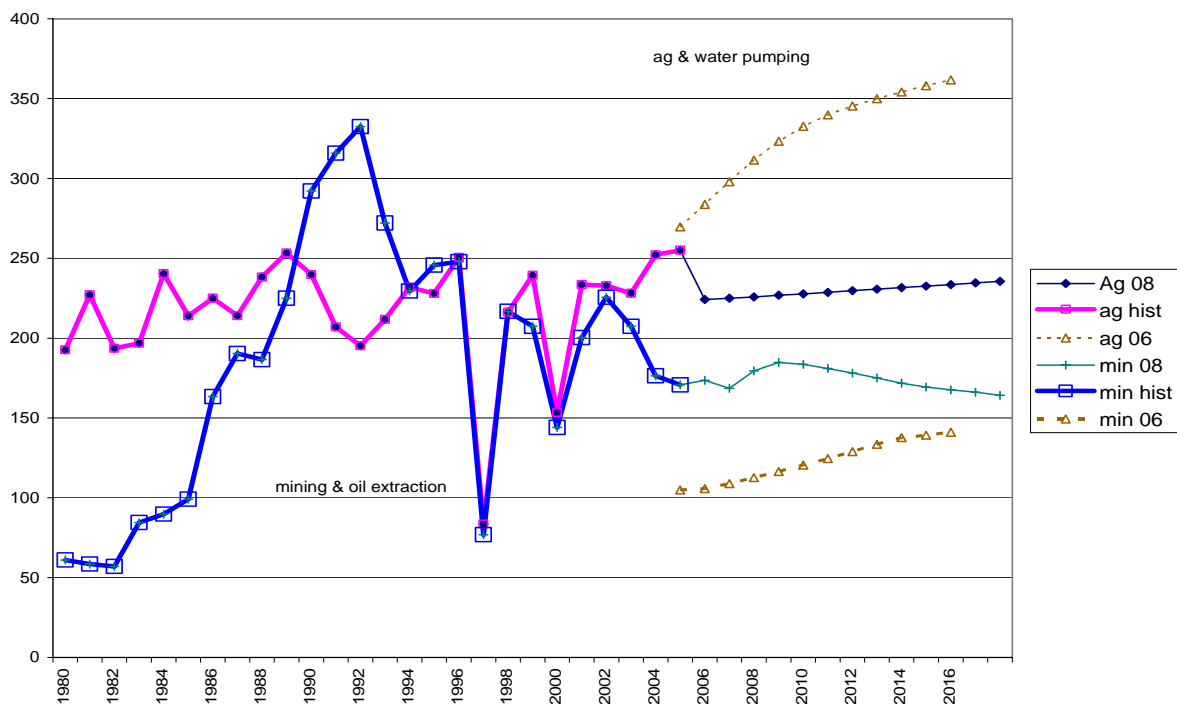
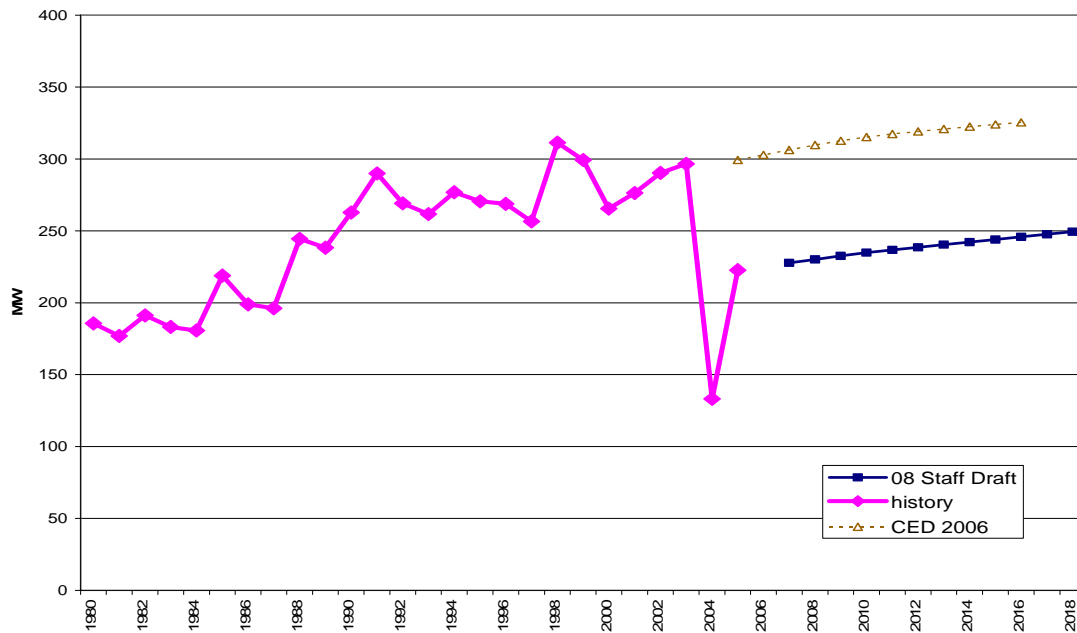


Figure 4-22 provides a comparison of the combined Other Sector peaks for the draft and CED 2006 forecasts. The CED 2006 forecast starts at a lower level, as does the consumption forecast, because of revised historic consumption data. Both forecasts have a similar growth rate.

**Figure 4-22: SDG&E Planning Area Other Sector Peak**



## ***Electricity Prices***

Pending the results of the forthcoming electricity price workshop, the draft CED 2008 forecast used prices which are held constant (in real terms) at the 2005 level for all sectors. This is in contrast to the declining price forecast which was used in the CED 2006 price forecast.

## ***Self-Generation***

As discussed in Chapter 1, the peak demand forecast is reduced by the projected effects of the SGIP and CSI programs. Both programs are forecast based on recent trend of installations. The resulting forecast of cumulative peak impacts is shown as "Private Supply" in Forms 1.2 and 1.4 following this chapter.



**Form 1.1 - SDG&E Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Electricity Consumption by Sector (GWh)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	TCU	Streetlighting	Total Consumption
1980	3,879	3,555	994	61	193	955	92	9,729
1981	3,848	3,577	1,037	58	227	968	89	9,804
1982	3,858	3,701	1,035	57	194	1,024	82	9,950
1983	3,909	3,900	987	85	197	1,038	77	10,192
1984	4,056	4,174	1,195	90	240	1,021	78	10,854
1985	4,249	4,291	1,199	99	214	1,058	77	11,187
1986	4,323	4,728	1,224	163	225	944	76	11,684
1987	4,638	4,917	1,322	190	214	1,019	77	12,377
1988	4,928	5,130	1,440	187	238	1,250	74	13,246
1989	5,144	5,406	1,527	225	253	1,311	73	13,939
1990	5,421	5,841	1,653	292	240	1,405	73	14,926
1991	5,333	5,698	1,640	316	207	1,495	76	14,764
1992	5,609	6,257	1,680	332	195	1,515	76	15,665
1993	5,549	6,253	1,665	272	212	1,521	77	15,549
1994	5,729	6,352	1,628	229	232	1,542	79	15,791
1995	5,734	6,503	1,595	246	228	1,537	81	15,923
1996	5,935	6,850	1,581	248	251	1,491	82	16,437
1997	6,123	7,384	1,694	77	84	1,637	83	17,082
1998	6,319	7,355	1,819	217	216	1,611	93	17,630
1999	6,453	7,716	1,979	207	239	1,624	93	18,312
2000	6,513	8,668	2,004	144	153	1,717	96	19,295
2001	6,116	7,537	1,815	200	233	1,671	98	17,671
2002	6,326	7,755	1,724	225	233	1,600	96	17,959
2003	6,745	8,133	1,673	207	228	1,628	105	18,720
2004	7,074	9,601	1,702	176	252	720	102	19,627
2005	7,105	9,089	1,669	171	255	1,202	105	19,595
2006	7,444	9,567	1,687	174	224	1,221	106	20,422
2007	7,605	9,736	1,682	168	225	1,235	107	20,759
2008	7,758	9,906	1,702	180	226	1,250	109	21,130
2009	7,912	10,078	1,722	185	227	1,264	110	21,498
2010	8,055	10,252	1,745	184	228	1,277	111	21,852
2011	8,186	10,417	1,771	181	229	1,288	112	22,184
2012	8,311	10,579	1,793	178	230	1,299	113	22,503
2013	8,431	10,740	1,811	175	231	1,310	114	22,812
2014	8,553	10,899	1,827	172	232	1,320	115	23,119
2015	8,678	11,058	1,847	169	233	1,331	116	23,431
2016	8,801	11,215	1,867	168	234	1,341	117	23,742
2017	8,922	11,372	1,882	166	235	1,352	118	24,046
2018	9,044	11,657	1,895	164	236	1,362	119	24,477

**Annual Growth Rates (%)**

1980-1990	3.4	5.1	5.2	16.9	2.2	3.9	-2.2	4.4
1990-2000	1.9	4.0	1.9	-6.8	-4.4	2.0	2.7	2.6
2000-2005	1.8	1.0	-3.6	3.5	10.7	-6.9	1.8	0.3
2005-2008	3.0	2.9	0.7	1.7	-4.0	1.3	1.3	2.5
2008-2018	1.5	1.6	1.1	-0.9	0.4	0.9	0.9	1.5
2005-2018	1.9	1.9	1.0	-0.3	-0.6	1.0	1.0	1.7

**Form 1.1b - SDG&E Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Electricity Sales by Sector (GWh)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	TCU	Streetlighting	Total Consumption
1980	3,879	3,555	994	61	193	955	92	9,729
1981	3,848	3,577	1,037	58	227	968	89	9,804
1982	3,858	3,695	1,028	57	194	1,024	82	9,938
1983	3,909	3,867	967	85	194	1,038	77	10,136
1984	4,056	4,118	1,131	90	238	991	78	10,701
1985	4,249	4,193	1,115	99	212	983	77	10,928
1986	4,323	4,603	1,109	163	225	861	76	11,360
1987	4,638	4,751	1,125	190	214	923	77	11,918
1988	4,927	4,924	1,191	187	238	1,148	74	12,690
1989	5,144	5,221	1,278	225	253	1,195	73	13,388
1990	5,421	5,663	1,424	292	239	1,284	73	14,397
1991	5,333	5,536	1,406	316	206	1,373	76	14,246
1992	5,609	6,112	1,456	332	195	1,404	76	15,184
1993	5,549	6,107	1,463	272	211	1,433	77	15,112
1994	5,729	6,201	1,441	229	232	1,450	79	15,361
1995	5,734	6,354	1,414	246	228	1,453	81	15,509
1996	5,935	6,701	1,400	248	251	1,412	82	16,028
1997	6,123	7,234	1,522	77	84	1,556	83	16,678
1998	6,319	7,212	1,658	217	216	1,533	93	17,247
1999	6,453	7,570	1,807	207	239	1,543	93	17,913
2000	6,513	8,530	1,852	144	153	1,637	96	18,924
2001	6,116	7,496	1,699	200	233	1,618	98	17,460
2002	6,326	7,712	1,595	225	233	1,559	96	17,745
2003	6,745	8,004	1,519	207	228	1,571	105	18,379
2004	7,074	9,437	1,545	176	252	665	102	19,253
2005	7,105	8,925	1,506	171	255	1,148	105	19,214
2006	7,443	9,374	1,509	174	224	1,161	106	19,990
2007	7,604	9,508	1,492	168	225	1,172	107	20,277
2008	7,756	9,634	1,501	180	226	1,182	109	20,587
2009	7,910	9,751	1,509	185	227	1,193	110	20,884
2010	8,053	9,859	1,520	184	228	1,202	111	21,156
2011	8,183	9,948	1,534	181	229	1,209	112	21,396
2012	8,307	10,039	1,552	178	230	1,218	113	21,638
2013	8,427	10,119	1,568	175	231	1,228	114	21,861
2014	8,549	10,188	1,581	172	232	1,238	115	22,074
2015	8,673	10,247	1,597	169	233	1,247	116	22,282
2016	8,796	10,294	1,614	168	234	1,257	117	22,479
2017	8,916	10,331	1,626	166	235	1,266	118	22,659
2018	9,038	10,479	1,634	164	236	1,274	119	22,944

**Annual Growth Rates (%)**

1980-1990	3.4	4.8	3.7	16.9	2.2	3.0	-2.2	4.0
1990-2000	1.9	4.2	2.7	-6.8	-4.4	2.5	2.7	2.8
2000-2005	1.8	0.9	-4.1	3.5	10.7	-6.9	1.8	0.3
2005-2008	3.0	2.6	-0.1	1.7	-4.0	1.0	1.3	2.3
2008-2018	1.5	0.8	0.9	-0.9	0.4	0.8	0.9	1.1
2005-2018	1.9	1.2	0.6	-0.3	-0.6	0.8	1.0	1.4

**Form 1.2 - SDG&E Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Net Energy for Load (GWh)**

	Total Consumption	Net Losses	Gross Generation	Private Supply	Net Energy for Load
1980	9,729	690	10,419	0	10,419
1981	9,804	695	10,499	0	10,499
1982	9,950	705	10,655	13	10,642
1983	10,192	719	10,911	56	10,855
1984	10,854	759	11,613	154	11,459
1985	11,187	775	11,962	259	11,703
1986	11,684	805	12,489	324	12,165
1987	12,377	845	13,222	459	12,763
1988	13,246	900	14,146	557	13,589
1989	13,939	949	14,888	551	14,337
1990	14,926	1,021	15,947	529	15,418
1991	14,764	1,010	15,774	519	15,256
1992	15,665	1,077	16,741	480	16,261
1993	15,549	1,071	16,620	436	16,184
1994	15,791	1,089	16,880	430	16,450
1995	15,923	1,100	17,023	414	16,609
1996	16,437	1,136	17,573	409	17,164
1997	17,082	1,182	18,264	404	17,860
1998	17,630	1,223	18,853	383	18,470
1999	18,312	1,270	19,582	399	19,183
2000	19,295	1,342	20,636	370	20,266
2001	17,671	1,238	18,909	211	18,698
2002	17,959	1,258	19,217	214	19,004
2003	18,720	1,303	20,023	341	19,682
2004	19,627	1,365	20,992	374	20,618
2005	19,595	1,362	20,957	381	20,576
2006	20,422	1,417	21,839	432	21,408
2007	20,759	1,438	22,197	482	21,714
2008	21,130	1,460	22,589	543	22,046
2009	21,498	1,481	22,979	614	22,365
2010	21,852	1,500	23,352	696	22,656
2011	22,184	1,517	23,701	788	22,912
2012	22,503	1,534	24,037	865	23,172
2013	22,812	1,550	24,362	950	23,411
2014	23,119	1,565	24,684	1,045	23,639
2015	23,431	1,580	25,011	1,150	23,861
2016	23,742	1,594	25,336	1,264	24,072
2017	24,046	1,606	25,653	1,388	24,265
2018	24,477	1,627	26,103	1,533	24,571

**Annual Growth Rates (%)**

1980-1990	4.4	4.0	4.3	#DIV/0!	4.0
1990-2000	2.6	2.8	2.6	-3.5	2.8
2000-2005	0.3	0.3	0.3	0.5	0.3
2005-2008	2.5	2.3	2.5	12.6	2.3
2008-2018	1.5	1.1	1.5	10.9	1.1
2005-2018	1.7	1.4	1.7	11.3	1.4

**Form 1.3 - SDG&E Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Coincident Peak Demand by Sector (MW)**

Year	Residential	Commercial	Industrial	Agricultural	Other	Total Demand
1980	645	848	191	24	161	1,870
1981	737	830	183	26	151	1,928
1982	633	854	192	24	167	1,871
1983	647	887	179	24	160	1,896
1984	801	974	210	27	154	2,166
1985	687	1,010	256	28	191	2,172
1986	689	1,056	278	29	169	2,222
1987	686	1,046	282	26	170	2,209
1988	874	1,157	311	30	214	2,587
1989	779	1,137	316	29	209	2,470
1990	883	1,261	373	28	235	2,780
1991	876	1,266	396	26	264	2,828
1992	1,055	1,374	377	21	248	3,076
1993	827	1,258	350	23	239	2,697
1994	1,141	1,351	338	27	250	3,107
1995	1,034	1,413	338	26	245	3,055
1996	1,097	1,408	331	30	239	3,105
1997	1,374	1,514	293	9	247	3,438
1998	1,277	1,698	409	27	284	3,695
1999	1,098	1,534	404	29	270	3,335
2000	1,074	1,547	343	17	248	3,230
2001	854	1,407	345	24	252	2,882
2002	1,114	1,530	359	27	263	3,294
2003	1,283	1,688	347	26	270	3,616
2004	1,370	1,949	312	25	108	3,764
2005	1,388	1,824	326	28	195	3,761
2006	1,613	1,972	333	26	200	4,143
2007	1,656	1,997	330	26	202	4,212
2008	1,699	2,026	337	26	204	4,291
2009	1,741	2,053	341	26	207	4,368
2010	1,782	2,081	345	26	209	4,443
2011	1,820	2,107	349	26	211	4,512
2012	1,857	2,133	352	26	212	4,580
2013	1,893	2,159	354	26	214	4,646
2014	1,930	2,184	356	26	216	4,712
2015	1,967	2,210	359	26	218	4,780
2016	2,003	2,235	362	26	219	4,846
2017	2,040	2,260	364	27	221	4,912
2018	2,076	2,325	366	27	223	5,016

**Annual Growth Rates (%)**

1980-1990	3.2	4.0	6.9	1.4	3.8	4.0
1990-2000	2.0	2.1	-0.8	-4.8	0.6	1.5
2000-2005	5.3	3.4	-1.0	10.4	-4.8	3.1
2005-2008	7.0	3.5	1.1	-2.6	1.6	4.5
2008-2018	2.0	1.4	0.8	0.3	0.9	1.6
2005-2018	3.1	1.9	0.9	-0.4	1.0	2.2

**Form 1.4 - SDG&E Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Peak Demand (MW)**

Year	Total End Use Load	Net Losses	Gross Generation	Private Supply	Net Peak Demand	Load Factor (%)
1980	1,870	180	2,050	0	2,050	58.0
1981	1,928	185	2,113	0	2,113	56.7
1982	1,871	179	2,050	2	2,048	59.3
1983	1,896	181	2,077	9	2,068	59.9
1984	2,166	205	2,371	26	2,346	55.8
1985	2,172	204	2,376	43	2,333	57.3
1986	2,222	208	2,430	54	2,376	58.5
1987	2,209	205	2,414	77	2,337	62.4
1988	2,587	239	2,826	93	2,733	56.8
1989	2,470	228	2,698	92	2,606	62.8
1990	2,780	258	3,038	89	2,949	59.7
1991	2,828	263	3,091	87	3,004	58.0
1992	3,076	288	3,364	81	3,283	56.5
1993	2,697	252	2,949	73	2,876	64.2
1994	3,107	291	3,398	72	3,326	56.5
1995	3,055	287	3,342	70	3,272	57.9
1996	3,105	291	3,396	69	3,328	58.9
1997	3,438	324	3,762	68	3,694	55.2
1998	3,695	349	4,044	64	3,979	53.0
1999	3,335	314	3,649	67	3,582	61.1
2000	3,230	304	3,534	62	3,471	66.6
2001	2,882	273	3,155	35	3,119	68.4
2002	3,294	313	3,606	36	3,570	60.8
2003	3,616	342	3,957	57	3,900	57.6
2004	3,764	355	4,119	63	4,056	58.0
2005	3,761	355	4,116	64	4,052	58.0
2006	4,143	389	4,533	86	4,447	55.0
2007	4,212	395	4,607	100	4,507	55.0
2008	4,291	401	4,692	114	4,578	55.0
2009	4,368	407	4,776	128	4,648	54.9
2010	4,443	413	4,856	142	4,714	54.9
2011	4,512	418	4,931	155	4,775	54.8
2012	4,580	424	5,004	166	4,838	54.7
2013	4,646	429	5,076	176	4,899	54.5
2014	4,712	434	5,147	186	4,960	54.4
2015	4,780	440	5,219	197	5,023	54.2
2016	4,846	445	5,291	207	5,084	54.0
2017	4,912	451	5,362	218	5,145	53.8
2018	5,016	460	5,475	229	5,247	53.5

**Annual Growth Rates (%)**

1980-1990	4.0	3.7	4.0		3.7	0.3
1990-2000	1.5	1.6	1.5	-3.5	1.6	1.1
2000-2005	3.1	3.1	3.1	0.5	3.1	-2.8
2005-2008	4.5	4.2	4.5	21.3	4.2	-1.8
2008-2018	1.6	1.4	1.6	7.2	1.4	-0.3
2005-2018	2.2	2.0	2.2	10.3	2.0	-0.6

**Form 1.7a - SDG&E Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Private Supply by Sector (GWh)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	TCU	Streetlighting	Total Consumption
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	6	7	0	0	0	0	13
1983	0	32	21	0	3	0	0	56
1984	0	57	64	0	3	30	0	154
1985	0	98	84	0	2	75	0	259
1986	0	125	116	0	0	83	0	324
1987	0	166	197	0	0	96	0	459
1988	0	206	249	0	0	102	0	557
1989	0	185	250	0	0	116	0	551
1990	0	178	229	0	1	122	0	529
1991	0	162	234	0	1	122	0	519
1992	0	144	224	0	1	111	0	480
1993	0	146	202	0	0	88	0	436
1994	0	152	187	0	0	92	0	430
1995	0	149	181	0	0	84	0	414
1996	0	149	181	0	0	79	0	409
1997	0	150	173	0	0	81	0	404
1998	0	143	161	0	0	78	0	383
1999	0	146	172	0	0	81	0	399
2000	0	139	152	0	0	80	0	370
2001	0	41	116	0	0	53	0	211
2002	0	43	130	0	0	41	0	214
2003	0	129	155	0	0	57	0	341
2004	0	163	157	0	0	54	0	374
2005	0	164	162	0	0	54	0	381
2006	1	193	178	0	0	60	0	432
2007	1	227	190	0	0	64	0	482
2008	2	272	202	0	0	68	0	543
2009	2	327	213	0	0	72	0	614
2010	3	392	225	0	0	76	0	696
2011	3	469	237	0	0	79	0	788
2012	3	541	240	0	0	81	0	865
2013	4	621	243	0	0	82	0	950
2014	4	711	247	0	0	83	0	1,045
2015	5	811	250	0	0	84	0	1,150
2016	5	921	253	0	0	85	0	1,264
2017	6	1,040	256	0	0	86	0	1,388
2018	6	1,178	261	0	0	88	0	1,533

**Annual Growth Rates (%)**

1980-1990					
1990-2000		-2.4	-4.1	-4.1	-3.5
2000-2005		3.4	1.4	-7.4	-2.7
2005-2008		18.4	7.5	7.5	9.7
2008-2018	14.4	15.8	2.6	2.6	11.1
2005-2018		16.4	3.7	3.7	10.6

**Form 2.2 - SDG&E Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Planning Area Economic and Demographic Assumptions**

Year	Population	Households	Persons per Household	Real Personal Income (Millions 2005\$)	Industrial Value Added (Millions 2005\$)
1980	1,890,510	718,312	2.63	16,476	12,902
1981	1,913,432	725,903	2.64	17,075	13,204
1982	1,948,429	732,411	2.66	17,394	12,795
1983	2,033,615	752,124	2.70	18,423	12,953
1984	2,136,850	783,080	2.73	20,807	13,620
1985	2,235,850	819,194	2.73	22,573	13,994
1986	2,323,871	860,569	2.70	24,045	14,184
1987	2,388,259	890,272	2.68	24,981	14,790
1988	2,442,254	916,425	2.66	25,932	15,557
1989	2,495,065	933,395	2.67	26,827	16,123
1990	2,549,875	946,084	2.70	27,067	16,469
1991	2,604,754	964,042	2.70	27,071	15,937
1992	2,653,615	977,591	2.71	27,656	15,878
1993	2,670,770	988,476	2.70	27,592	15,868
1994	2,688,860	998,758	2.69	27,859	15,791
1995	2,699,012	1,008,967	2.68	28,402	16,659
1996	2,714,332	1,019,262	2.66	29,521	16,411
1997	2,780,839	1,032,431	2.69	31,373	17,471
1998	2,842,512	1,047,694	2.71	34,508	17,603
1999	2,908,551	1,064,929	2.73	36,834	17,030
2000	2,975,401	1,078,423	2.76	39,897	17,401
2001	3,055,536	1,095,236	2.79	41,387	15,249
2002	3,117,907	1,112,268	2.80	42,622	14,711
2003	3,169,667	1,128,467	2.81	43,669	14,289
2004	3,209,504	1,144,446	2.80	45,983	15,022
2005	3,243,465	1,160,012	2.80	47,831	15,308
2006	3,293,813	1,176,539	2.80	50,201	15,553
2007	3,344,295	1,193,068	2.80	52,141	15,731
2008	3,394,911	1,209,598	2.81	53,894	16,000
2009	3,445,664	1,226,130	2.81	55,641	16,215
2010	3,492,651	1,241,408	2.81	57,252	16,364
2011	3,534,515	1,254,866	2.82	58,719	16,562
2012	3,576,403	1,268,301	2.82	60,034	16,660
2013	3,618,317	1,281,709	2.82	61,244	16,794
2014	3,660,254	1,295,094	2.83	62,466	16,837
2015	3,702,219	1,308,457	2.83	63,708	16,930
2016	3,744,210	1,321,798	2.83	64,898	16,996
2017	3,786,225	1,335,111	2.84	66,020	17,050
2018	3,828,266	1,348,402	2.84	67,155	17,056

**Annual Growth Rates (%)**

1980-1990	3.0	2.8	0.2	5.1	2.5
1990-2000	1.6	1.3	0.2	4.0	0.6
2000-2005	1.7	1.5	0.3	3.7	-2.5
2005-2008	1.5	1.4	0.1	4.1	1.5
2008-2018	1.2	1.1	0.1	2.2	0.6
2005-2018	1.3	1.2	0.1	2.6	0.8

## **CHAPTER 5: SACRAMENTO MUNICIPAL UTILITY DISTRICT PLANNING AREA**

The Sacramento Municipal Utility District (SMUD) planning area includes SMUD retail customers, but does not include the new members of the SMUD control area, Roseville, Redding, and the Western Area Power Administration (WAPA). To support electricity system analysis, staff derives forecasts by control area and CAISO congestion zone from the planning area forecasts. Using historic consumption data and regional population projections, the estimated share of the PG&E forecast for WAPA, Roseville, and Redding forecasts are subtracted from the PG&E planning area and added to the SMUD control area. Those results are presented in Chapter 1, Tables 1-3 and 1-4. The results in this chapter are for the SMUD planning area only.

This chapter is organized as follows. First, forecasted consumption and peak loads for the SMUD planning area are discussed; both total and per capita values are presented. The draft CED 2008 values are compared to the CED 2006 forecast; differences between the two forecasts are explained. The forecasted load factor, jointly determined by the consumption and peak load estimates, is also discussed. Second, sector consumption and peak load forecasts are presented. The residential, commercial, industrial and “other” sector staff draft forecasts are compared to those in CED 2006; again, differences between the two are discussed. Third, the sector electricity prices used as inputs to the staff draft forecast are presented.

### **Forecast Results**

Table 5-1 presents a comparison of electricity consumption and peak demand for selected years. Figures 5-1 and 5-2 present a comparison of the draft CED 2008 forecast with the CED 2006 forecast.



**Table 5-1**  
**SMUD Planning Area Forecast Comparison**

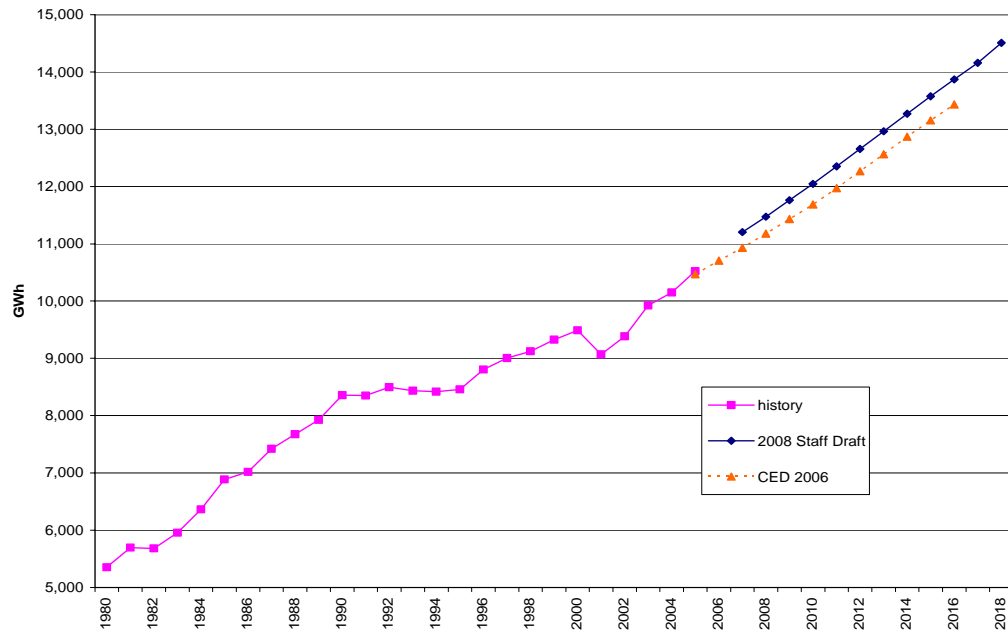
Consumption (GWH)				Peak (MW)		
	CED 2006	Staff Draft	Percent Difference Staff Draft/CED 2006	CED 2006	Staff Draft	Percent Difference Staff Draft/CED 2006
1990	8,358	8,358	0.00%	2,198	2,198	0.00%
2000	9,491	9,491	0.00%	2,693	2,693	0.00%
2005	10,468	10,523	0.52%	2,923	2,964	1.39%
2008	11,178	11,474	2.65%	3,136	3,207	2.25%
2013	12,566	12,966	3.18%	3,567	3,645	2.16%
2016	13,435	13,870	3.24%	3,844	3,913	1.79%
Annual Average Growth Rates						
1990-2000	1.28%	1.28%		2.05%	2.05%	
2000-2005	1.98%	2.09%		1.66%	1.94%	
2005-2008	2.21%	2.93%		2.37%	2.66%	
2008-2016	2.33%	2.40%		2.58%	2.52%	
Historic values are shaded						

As seen in Table 5-1, the draft CED 2008 forecast is about 3 percent higher than the CED 2006 forecast for most of the forecast period. The nearly identical growth rates of the two forecasts are shown in Figure 5-1, with the majority of the difference in the draft CED 2008 forecast being in a higher starting value. This increase is caused by both higher economic and demographic inputs in the residential and commercial sectors.

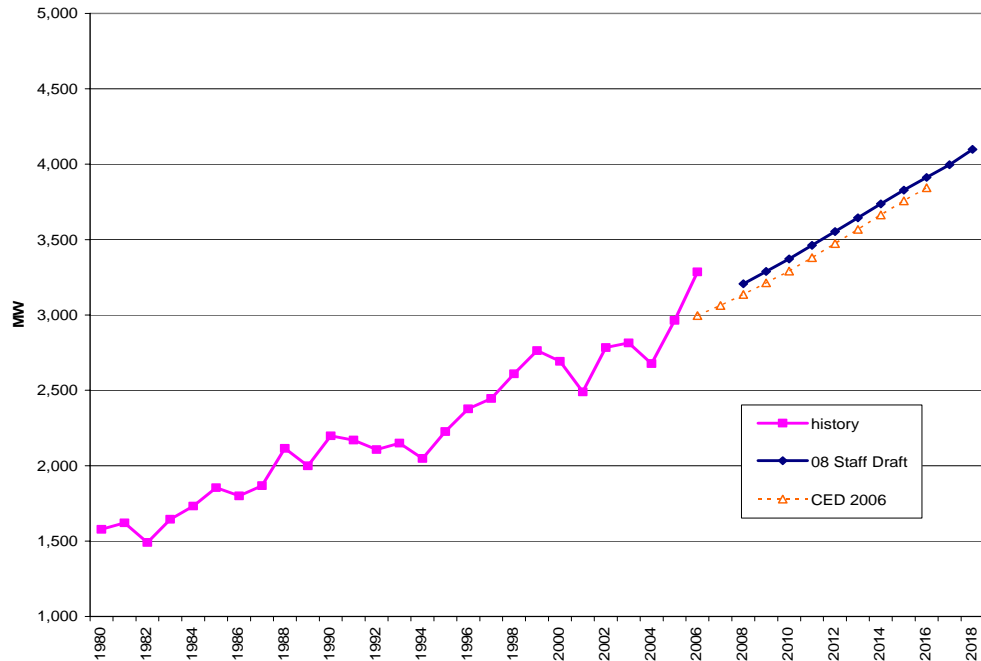
In the forecast period, the residential forecast drivers of population and households are very similar for both the draft CED 2008 and CED 2006 forecasts. The staff draft household income projection is slightly lower than the CED 2006 in the early years of the forecast period, but grows at a faster rate and is slightly higher by the end of the forecast period. Commercial floor space is also projected to grow at a faster rate than CED 2006 projections, while industrial production drivers are forecast to be relatively similar.

The draft CED 2008 SMUD planning area peak demand forecast, shown in Figure 5-2, is also higher over the entire forecast period than the CED 2006 forecast. Major reasons for the higher peak forecast are the same as the higher energy forecast. A smaller contributor to the increase is the use of new residential and industrial load shapes to more accurately account for air conditioning use during the summer and use of actual SMUD load profile data to portray SMUD residential loads.

**Figure 5-1: SMUD Planning Area Electricity Forecast**

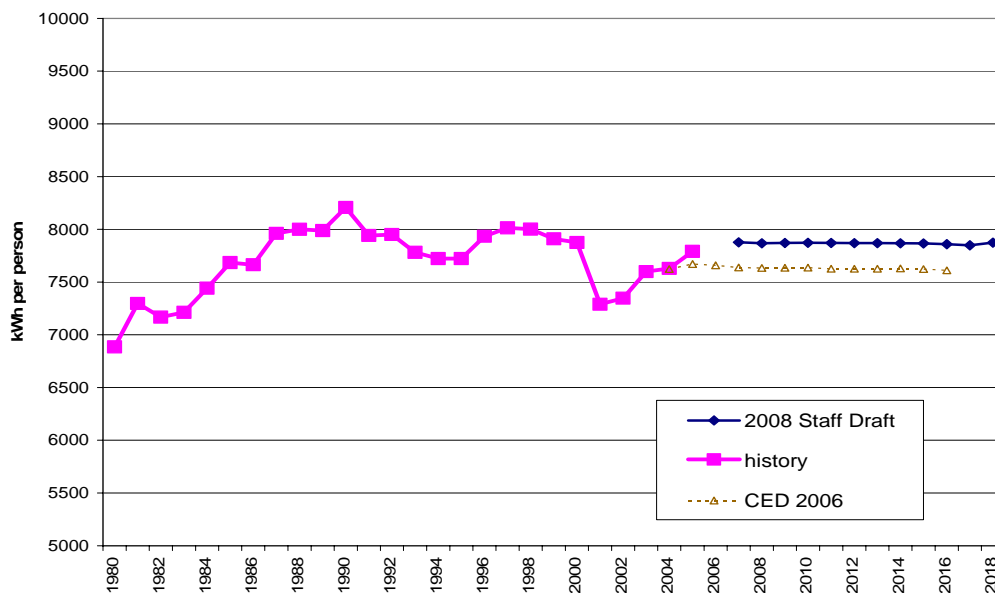


**Figure 5-2: SMUD Planning Area Peak**



Figures 5-3 compares the old and new per capita electricity consumption forecasts for the SMUD planning area. Projected per capita consumption in the draft CED 2008 is slightly higher than in the CED 2006 forecast. After adjusting for the difference in starting level, both forecasts are constant over the forecast period. The draft CED 2008 per capita electricity consumption forecast is still below pre-energy crisis levels. Unlike other larger planning areas, SMUD has uniform climate throughout its service area, thus there are no shifts toward sub-areas creating higher usage levels.

**Figure 5-3: SMUD Planning Area per Capita Electricity Consumption**



Draft CED 2008 per capita peak demand, shown in Figure 5-4, remains constant over the forecast period at a slightly higher level than the CED 2006 forecast. The projections are lower than the 2006 because they assume normal weather rather than the extreme temperatures seen in 2006. This level is slightly higher than the CED 2006 level due to a rebound from the energy crisis, but still below levels seen in the mid to late 1990s.

**Figure 5-4: SMUD Planning Area per Capita Peak Demand**

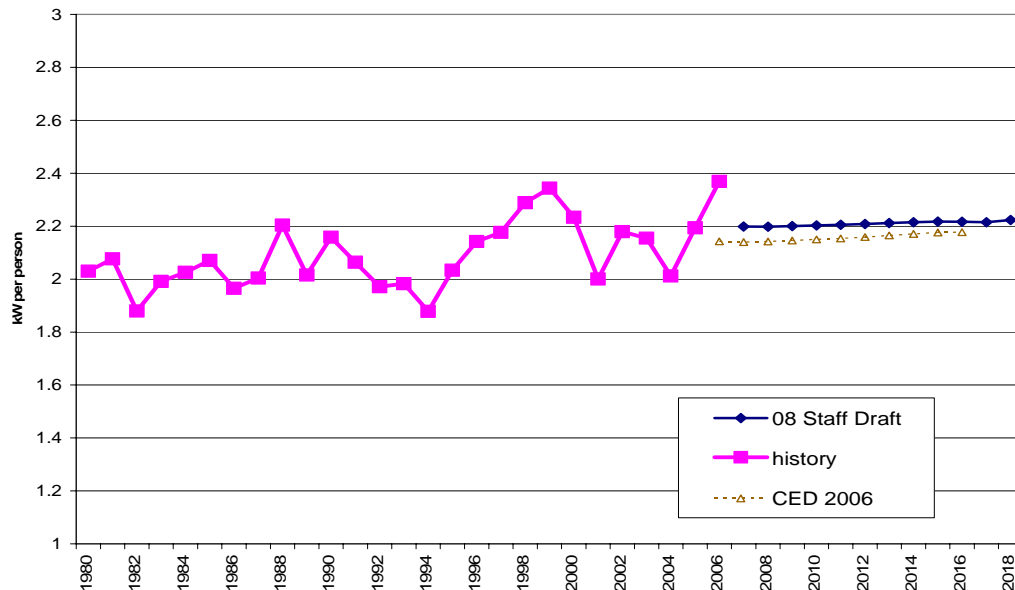
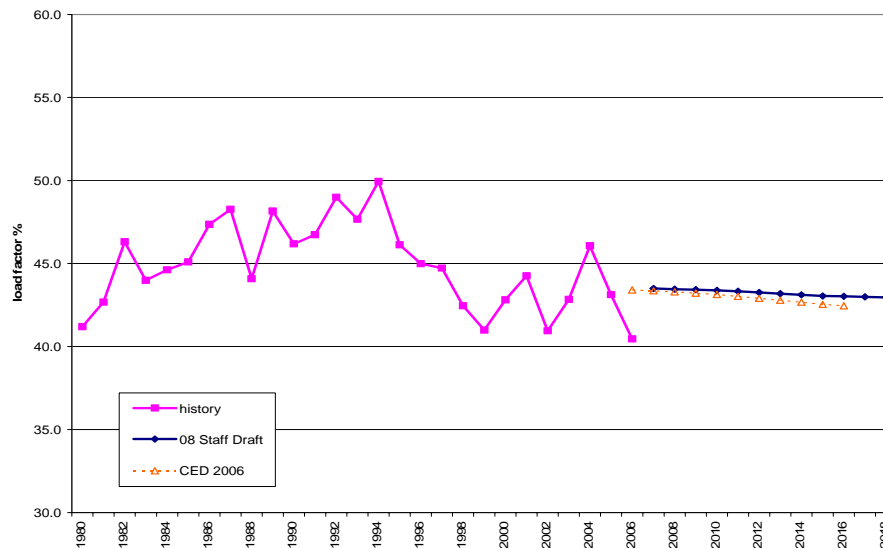


Figure 5-5 compares the load factors of the two forecasts. The load factor is a measure of the relative increase in peak demand with respect to annual electricity consumption. Lower load factors indicate a sharp rise, while higher load factors indicate a more stable load. Variation in historic load factors is caused in part by annual weather patterns. The SMUD load factor has been declining since the mid-990s, as the residential sector—with a continually increasing presence of air conditioning--grew faster than other sectors. The forecasted load factor continues this decline, although at a slower rate because projected of faster growth in the commercial and industrial sectors than in the residential sector.

**Figure 5-5: SMUD Planning Area Load Factor**



## Sector Level Results and Input Assumptions

### *Residential*

Figure 5-6 provides a comparison between the draft CED 2008 and CED 2006 SMUD planning area residential forecasts. The draft CED 2008 forecast is virtually identical to the CED 2006 until the end of the forecast period. This difference, which becomes apparent in 2013, reflects the effects of staff's revised appliance saturations that incorporate the findings of the most recent residential survey, especially the installation of high efficiency air conditioners.

**Figure 5-6: SMUD Planning Area Residential Consumption**

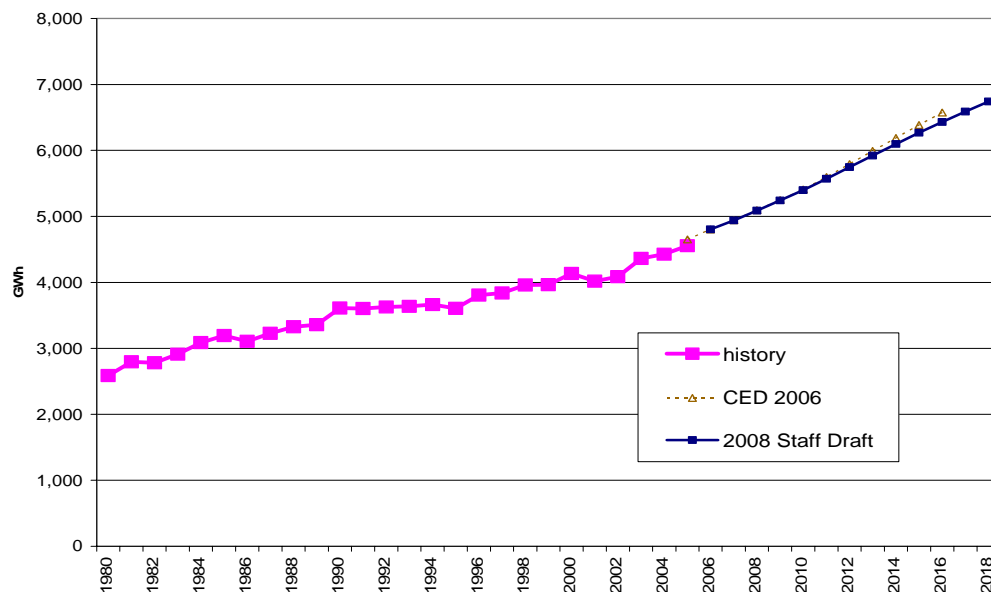
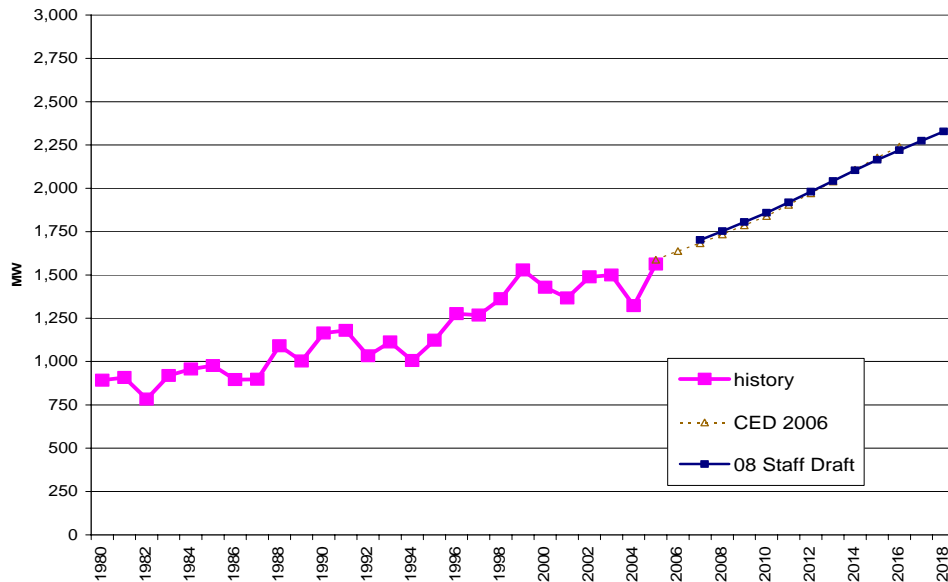


Figure 5-7 provides a comparison of the draft CED 2008 and CED 2006 residential peak demand forecasts. Both forecasts are nearly the same as in the residential electricity consumption forecast. The difference at the end of the forecast period in Figure 5-6 is less noticeable here because standards for highly efficient air conditioners have less impact on peak than on energy.

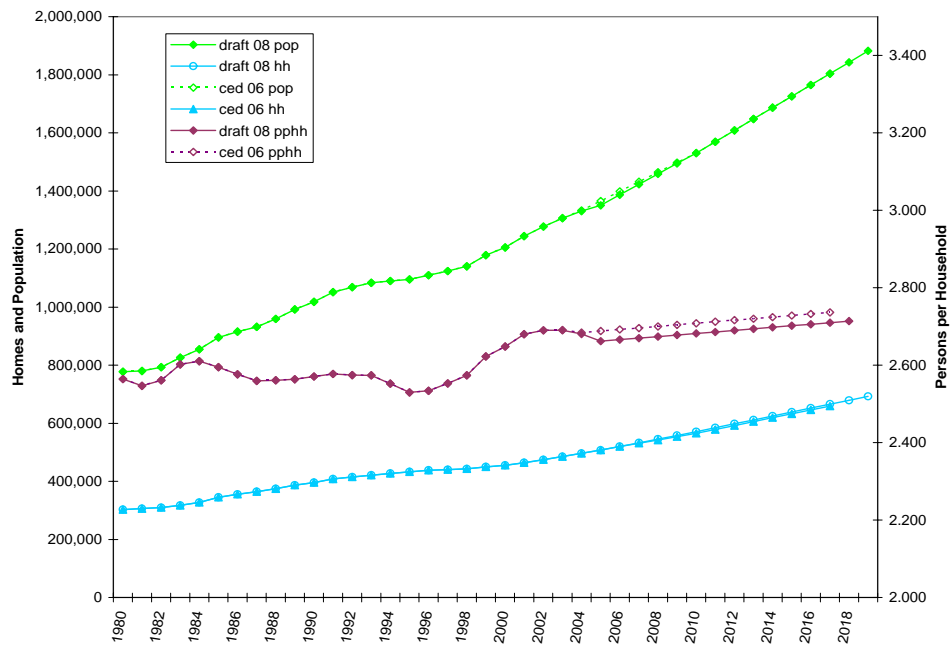
**Figure 5-7: SMUD Planning Area Residential Peak**



Figures 5-8 and 5-9 provide comparisons of the residential drivers used in the draft CED 2008 forecast with drivers used in CED 2006. Figure 5-8 provides comparisons of total population, total households, and persons per household projections. The two forecasts have virtually identical population and household projections. The slight difference that does exist contributes to a staff draft projection of persons-per-household that is 0.8 percent lower than the CED 2006 projection by the end of the forecast.

Figure 5-9 provides a comparison of household income between the two forecasts. Household income is derived as the product of per capita income and persons per household. The CED 2006 projection is higher in the early years of the forecast, although the staff draft projection has a faster growth rate. The staff draft income projection, relative to CED 2006, is consistent with the same comparison for the PG&E forecast, reflecting a consistency in projected economic activity across Northern California.

**Figure 5-8: SMUD Planning Area Residential Demographic Projections**



**Figure 5-9: SMUD Planning Area Household Income Projections**

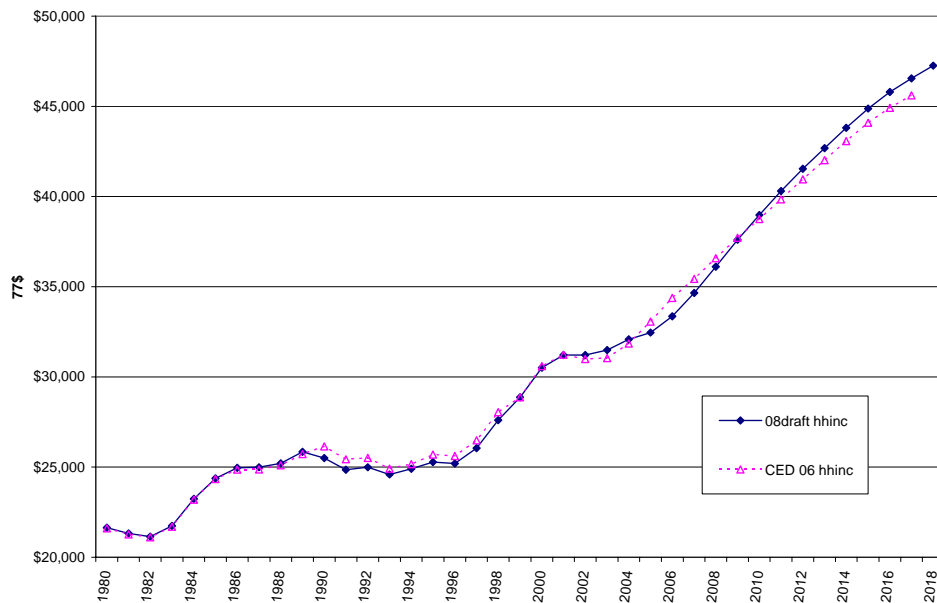
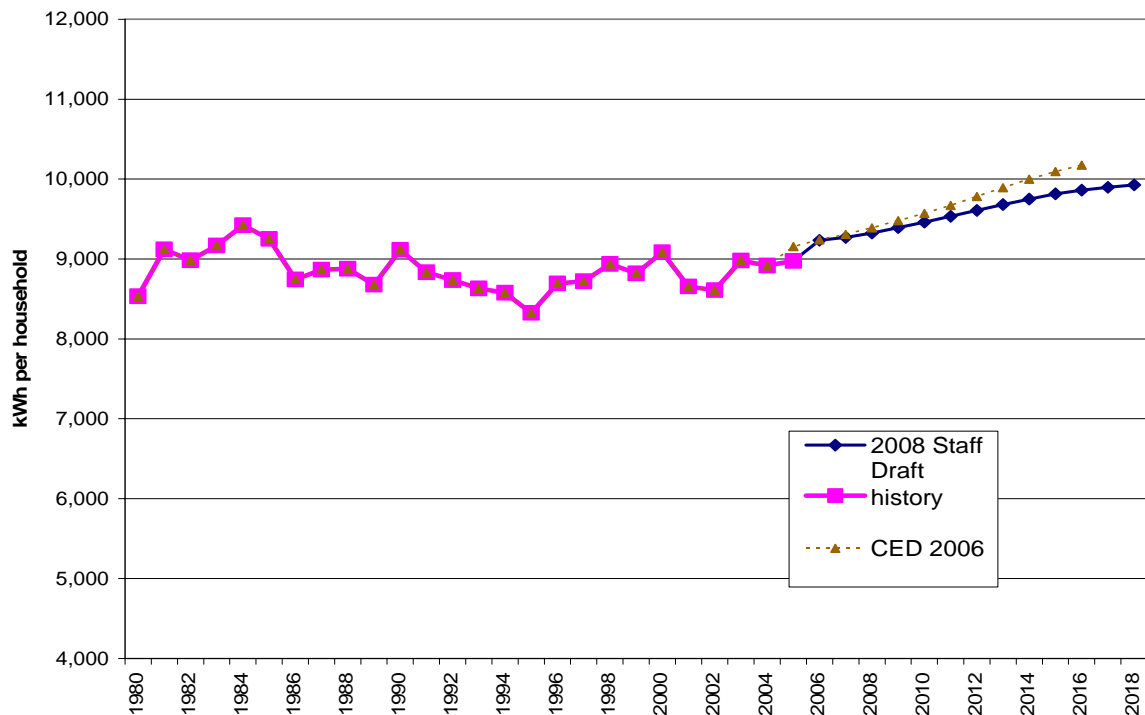


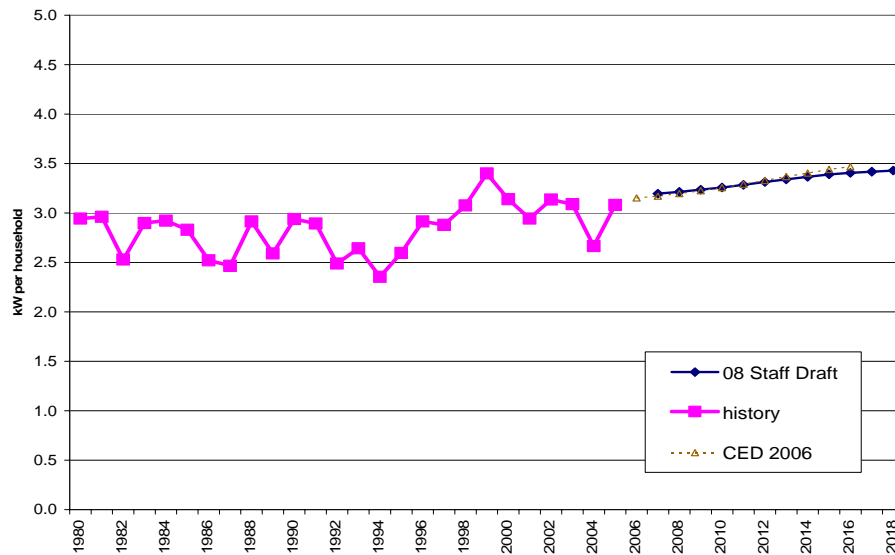


Figure 5-10 presents a comparison of electricity use per household between the two forecasts as well as the 1980-2005 historic series. The draft CED 2008 use per household forecast grows at a slower rate than the CED 2006 forecast due to a lower estimate of persons per household and incorporation of new appliance saturation projections based on more recent residential surveys. The decrease in peak use per household, as seen in Figure 5-11, is less than the difference for energy. The reason is the reduced effect of air conditioning savings at peak, while the population growth rate is still higher than the growth in peak demand.

**Figure 5-10: SMUD Planning Area Electricity Use per Household**



**Figure 5-11: SMUD Planning Area Peak Use per Household**

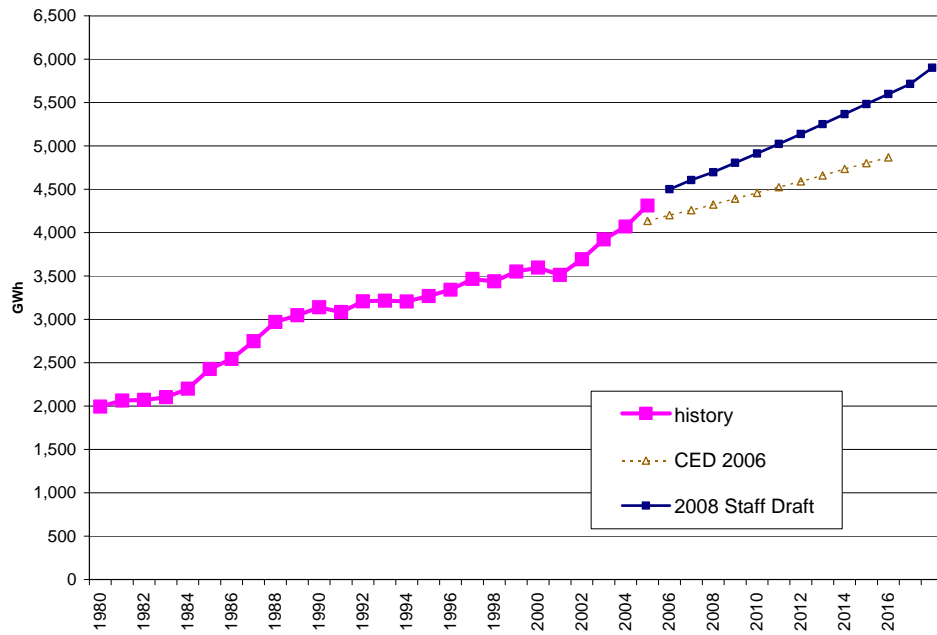


### ***Commercial Building Sector***

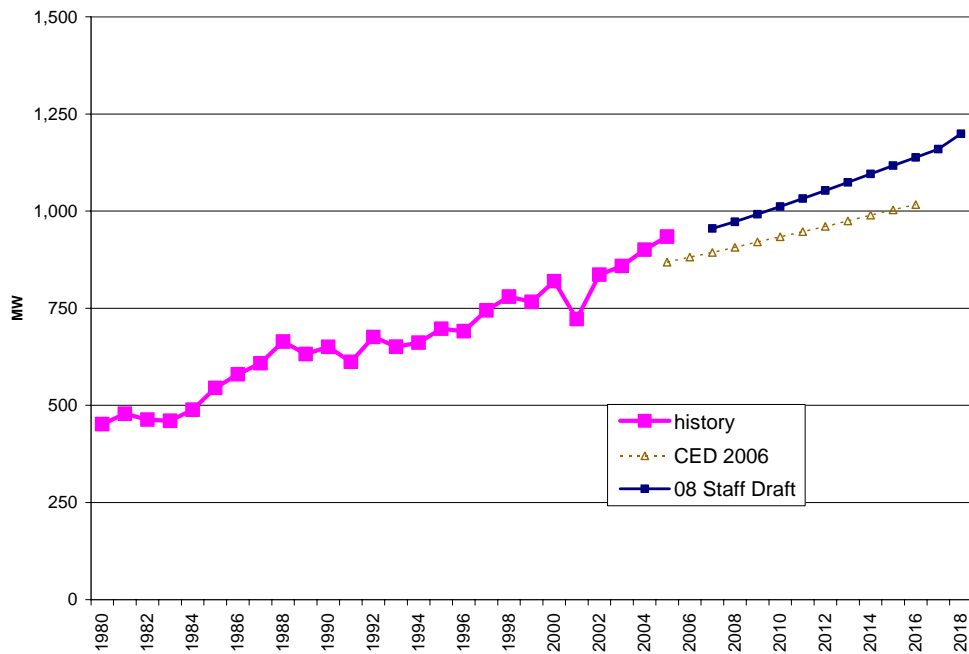
Figure 5-12 provides a comparison of the commercial building sector forecasts. The draft CED 2008 begins slightly above the CED 2006 forecast because actual consumption in 2005 was greater than was projected in CED 2006. The growth rate of the draft CED 2008 is higher than the previous forecast due to a change in the floor space estimation technique, which leads to an increase in projected commercial square footage. This increase is somewhat offset by impacts of the 1998, 2001 and 2005 commercial building standards. The net result is a higher forecast throughout the forecast period than was projected in the CED 2006 forecast.

Figure 5-13 provides a comparison of the commercial peak demand forecasts. The CED 2006 commercial peak forecast is higher throughout the forecast period given its higher starting point brought about by the use of SMUD sector specific load profiles for calibration and also revised floor space projections.

**Figure 5-12: SMUD Planning Area  
Commercial Building Consumption**

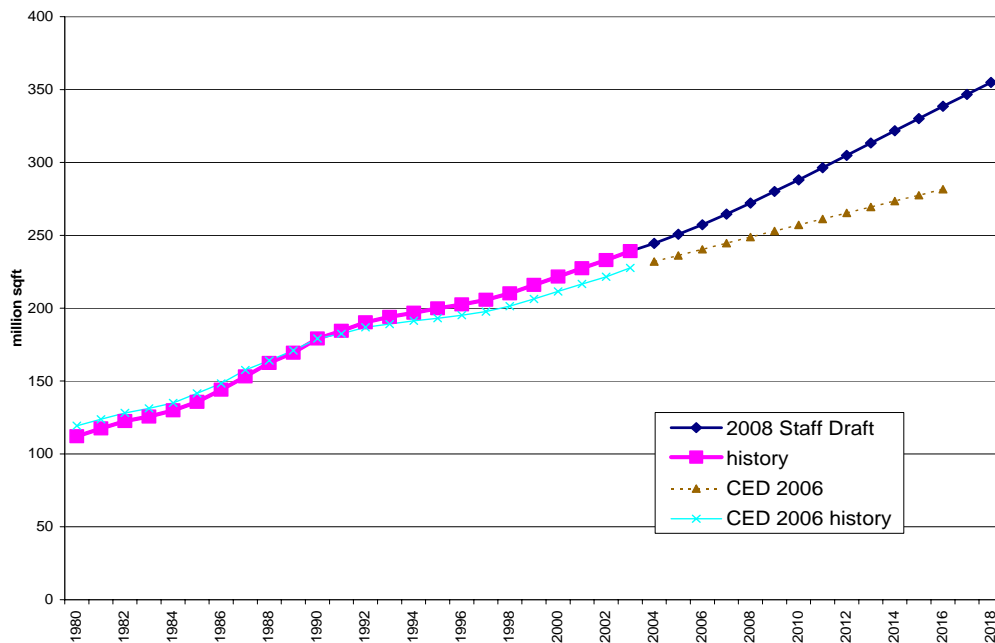


**Figure 5-13: SMUD Planning Area  
Commercial Building Sector Peak**



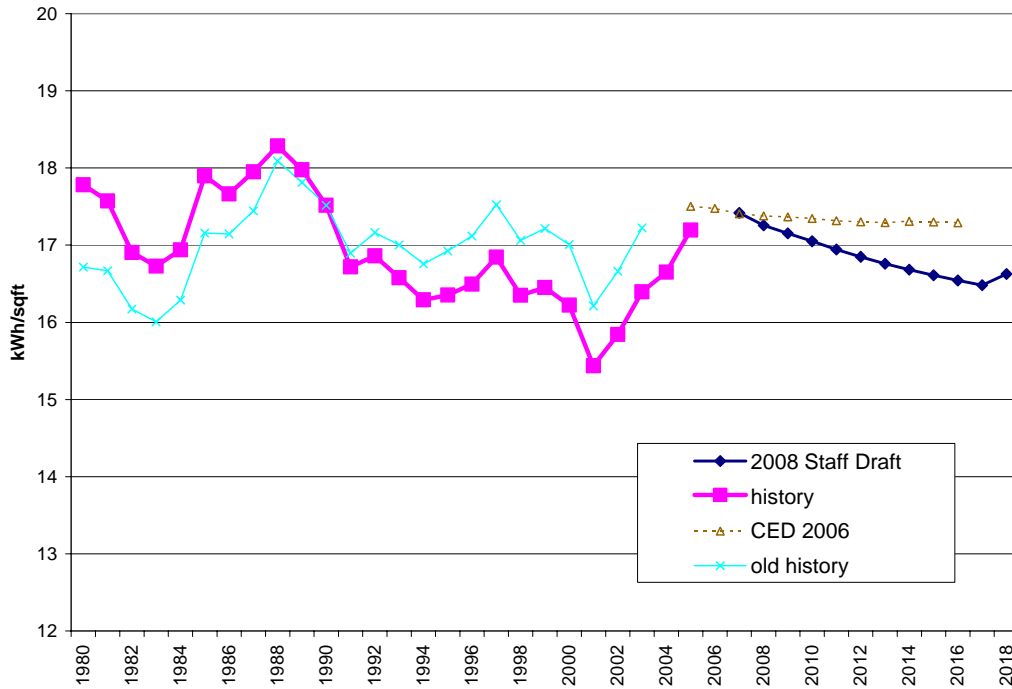
In staff's commercial building sector forecasting model, floor space by building type (for example, retail, offices, schools, and hospitals) is the key driver of electricity growth. Figure 5-14 provides a comparison of total commercial floor space projections. The draft CED 2008 floor space projections are higher over the forecast period, including the 1990s, than those used in CED 2006.

**Figure 5-14: SMUD Planning Area Commercial Floor Space**

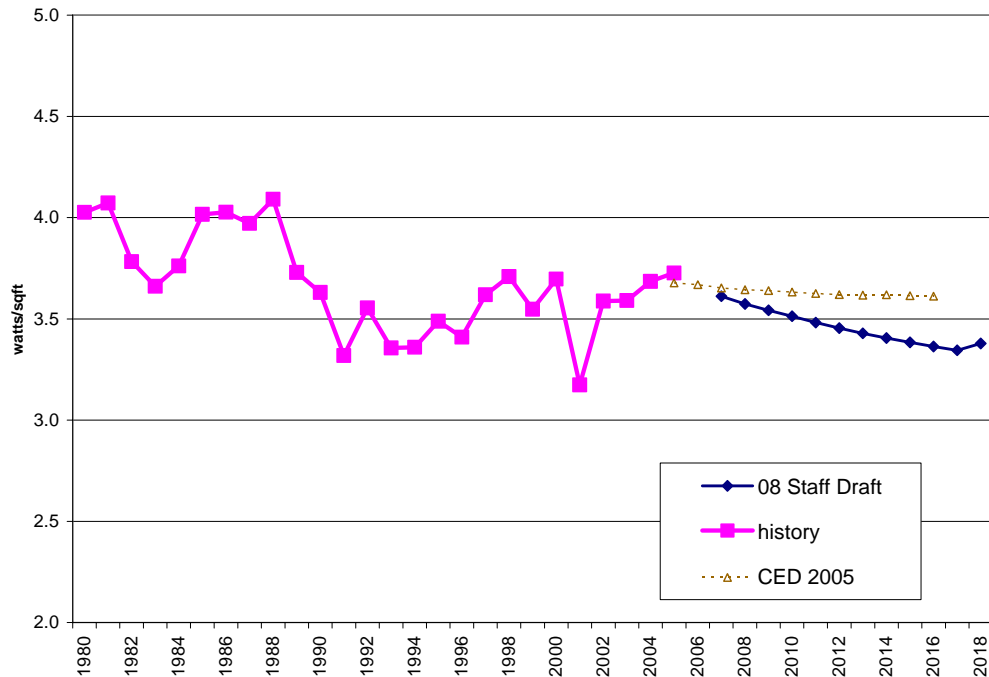


This higher floor space projection is somewhat offset by a decline in projected use per square foot over the forecast period, shown in Figures 5-15 and 5-16. This decline is a result of an increasing proportion of new floor space with more efficient end use intensities. Commercial consumption per square foot, in terms of both energy and peak, decreases sharply in the forecast period of the draft CED 2008.

**Figure 5-15: SMUD Planning Area  
Commercial kWh per Square Foot**



**Figure 5-16: SMUD Planning Area Peak per Square Foot**



## Industrial Sector

Figure 5-17 provides comparisons of the SMUD planning area industrial sector electricity consumption forecasts. The draft CED 2008 industrial electricity consumption forecast begins at a lower level than the CED 2006 forecast, but has a higher growth rate. By the end of the forecast period the staff draft is higher. The beginning difference is the result of the recent reclassification of some nonresidential activities brought about by the conversion of SIC based classification to NAICS based classification.<sup>1</sup>

**Figure 5-17: SMUD Planning Area Industrial Consumption**

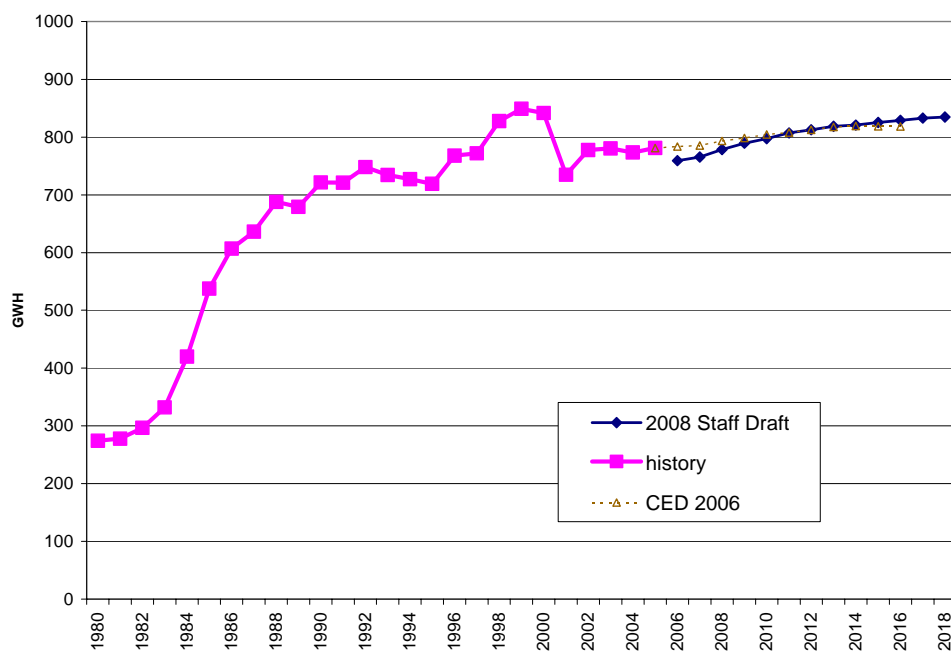


Figure 5-18 provides a comparison of the industrial sector peak forecasts. In contrast to the consumption forecasts, the draft CED 2008 forecast starts from a higher initial 2007 value and is higher throughout the forecast period. New load shapes were used in the draft CED 2008 to more accurately reflect industrial loads. The CED 2006 and draft CED 2008 growth rates are nearly the same from 2009 onward.

**Figure 5-18: SMUD Planning Area Industrial Sector Peak**

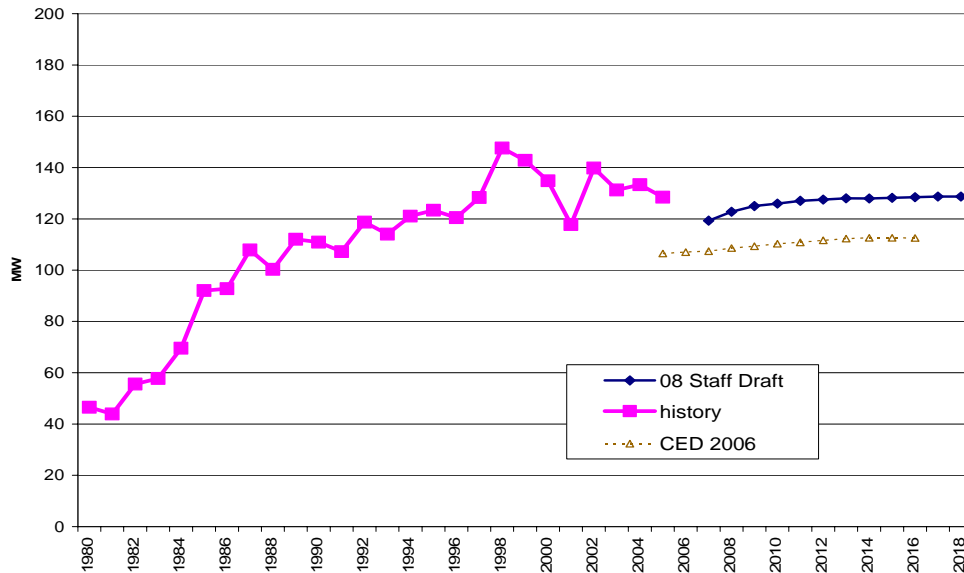
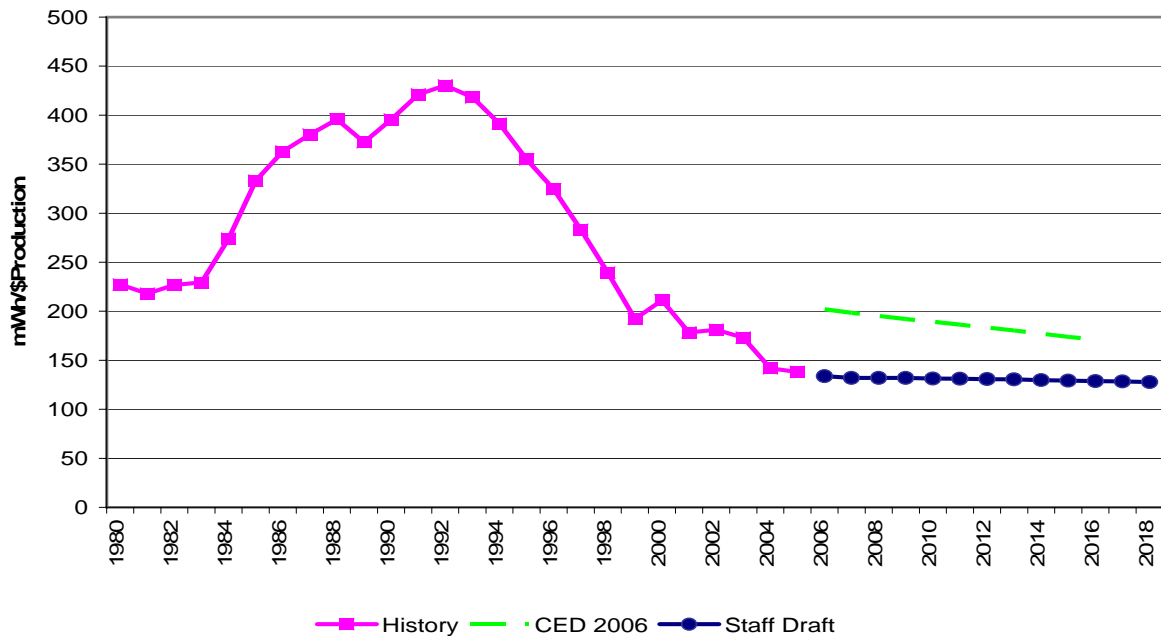


Figure 5-19 provides a comparison of use per dollar value of production between the draft CED 2008 and CED 2006 forecasts. The difference in kWh per dollar of industrial value added in the draft CED 2008 and CED 2006 industrial forecasts, especially in the early years, is due to different starting points. These points differ as a result of revised the historic industrial production data used for the forecast.

**Figure 5-19: SMUD Planning Area  
Industrial Use per Production Unit**



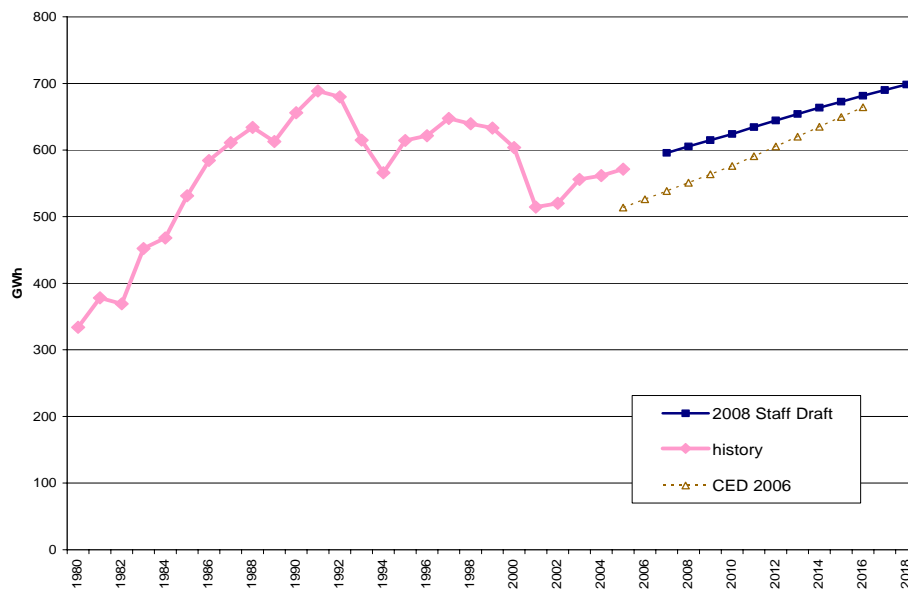


## Other Sectors

Figures 5-20 and 5-21 provide comparisons of the remaining sector electricity consumption forecasts. Figure 4-20 provides a comparison of the transportation, communication and utilities (TCU) sector forecasts. The draft CED 2008 forecast is lower than the CED 2006 forecast because of a lower historic starting point.

Figure 5-21 provides comparisons of the agriculture and water pumping and mining and oil extraction sector forecasts. The draft CED 2008 agriculture and water pumping forecast is lower than the CED 2006 because of higher projected electricity rates. The CED 2006 mining and oil extraction forecast has a higher starting point because of changes in the unclassified consumption distribution. The lower growth rate of the draft forecast reflects the pattern of Economy.com's forecast of mining sector employment, which is used as the forecast driver.

**Figure 5-20: SMUD Planning Area  
Transportation, Communication & Utilities Sector  
Electricity Consumption**



**Figure 5-21: SMUD Planning Area  
Agriculture & Water Pumping and Mining & Oil Extraction  
Electricity Consumption Forecasts**

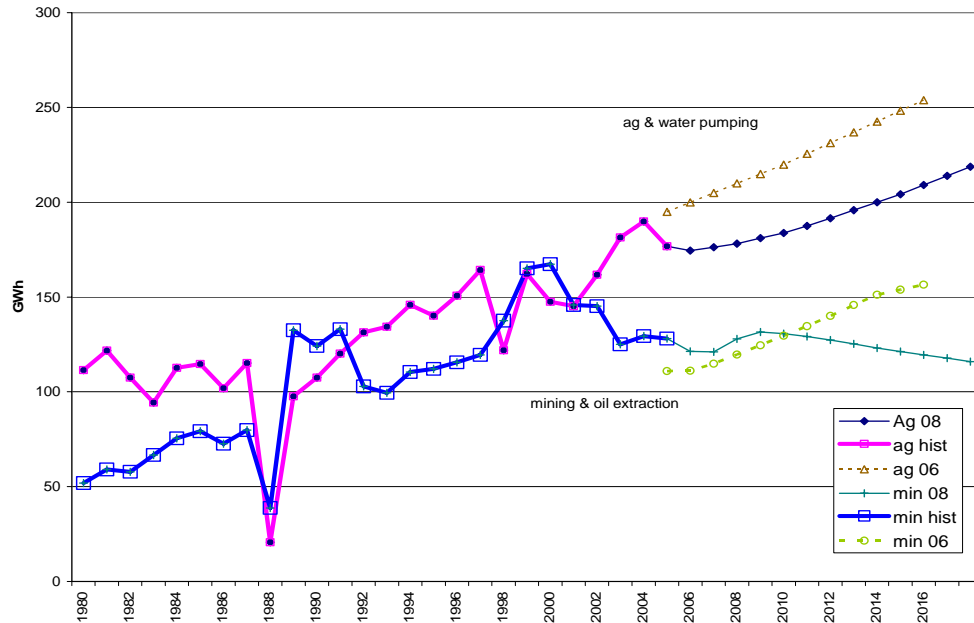
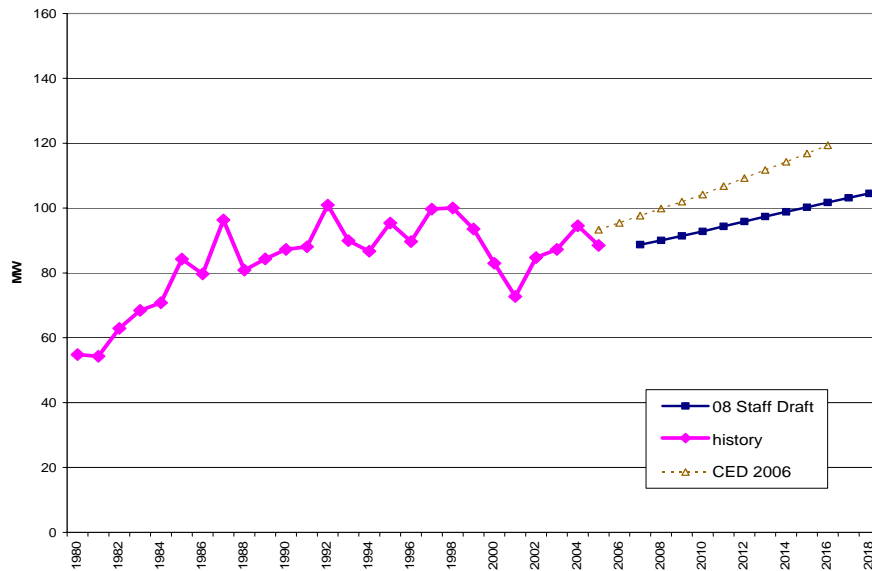


Figure 5-22 provides a comparison of the combined Other Sector peaks for the draft CED 2008 and CED 2006 forecasts. The draft CED 2008 forecast is lower over the entire forecast period than the CED 2006 given a lower assumed starting point resulting from a reclassification of historical consumption. However, the growth rate of the draft CED 2008 forecast is essentially the same as the CED 2006 forecast. Clearly, the absolute values for the forecast are sensitive to historic values that have not been accurately reported.

**Figure 5-22: SMUD Planning Area Other Sector Peak**



### ***Electricity Prices***

Pending the results of the forthcoming electricity price workshop, the draft CED 2008 forecast used prices which are held constant (in real terms) at the 2005 level for all sectors. This is in contrast to the declining price forecast which was used in the CED 2006 price forecast.

### ***Self-Generation***

As discussed in Chapter 1, the peak demand forecast is reduced by the projected effects of the SGIP and CSI programs. Both programs are forecast based on recent trend of installations. SMUD has had an aggressive solar program for many years but the historic impacts have not been accounted for in the Energy Commission forecast or historic. The forecast of peak impacts for the SMUD area represent incremental installations from 2007 forward. It shown as “Private Supply” in Forms 1.2 and 1.4 following this chapter.

<sup>1</sup> As a result of NAFTA, the federal government replaced the SIC system with the NAICS system. In turn, the CEC modified its regulations requiring utilities to classify all end users from SIC to NAICS to allow economic data to be matched to utility consumption data.

**Form 1.1 - SMUD Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Electricity Consumption by Sector (GWh)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	TCU	Streetlighting	Total Consumption
1980	2,587	1,994	274	52	111	278	56	5,352
1981	2,794	2,064	278	59	122	322	56	5,695
1982	2,781	2,071	297	58	107	311	58	5,683
1983	2,910	2,102	332	67	94	396	56	5,956
1984	3,086	2,200	420	75	113	415	53	6,362
1985	3,193	2,428	538	79	115	476	56	6,884
1986	3,107	2,543	607	73	102	528	57	7,016
1987	3,229	2,749	636	80	115	552	59	7,419
1988	3,326	2,969	688	39	21	574	60	7,677
1989	3,359	3,046	679	133	98	550	62	7,927
1990	3,611	3,138	721	124	107	589	67	8,358
1991	3,603	3,083	721	133	120	620	68	8,349
1992	3,626	3,208	748	103	131	611	68	8,496
1993	3,636	3,216	734	100	134	547	68	8,435
1994	3,662	3,207	727	110	146	495	71	8,418
1995	3,604	3,268	719	112	140	542	72	8,458
1996	3,808	3,342	768	116	151	547	75	8,805
1997	3,839	3,464	772	119	164	572	75	9,006
1998	3,959	3,437	828	138	122	564	75	9,123
1999	3,966	3,551	849	165	162	553	80	9,326
2000	4,135	3,596	842	167	147	523	81	9,491
2001	4,019	3,511	735	146	145	436	79	9,070
2002	4,087	3,692	778	145	162	441	79	9,383
2003	4,361	3,921	780	125	181	476	80	9,924
2004	4,426	4,070	773	129	190	482	80	10,151
2005	4,554	4,311	781	128	177	490	81	10,523
2006	4,803	4,500	759	121	175	503	83	10,944
2007	4,939	4,607	765	121	176	512	84	11,204
2008	5,086	4,698	779	128	178	520	85	11,474
2009	5,241	4,804	789	131	181	529	86	11,762
2010	5,398	4,912	797	131	184	537	87	12,046
2011	5,571	5,022	807	129	187	546	89	12,351
2012	5,746	5,137	813	127	192	554	90	12,658
2013	5,921	5,251	819	125	196	563	91	12,966
2014	6,096	5,367	821	123	200	571	92	13,271
2015	6,268	5,483	825	121	204	579	93	13,575
2016	6,432	5,599	829	119	209	587	95	13,870
2017	6,588	5,715	833	118	214	594	96	14,157
2018	6,742	5,901	835	116	219	602	97	14,510

**Annual Growth Rates (%)**

1980-1990	3.4	4.6	10.2	9.1	-0.4	7.8	1.8	4.6
1990-2000	1.4	1.4	1.6	3.0	3.2	-1.2	1.9	1.3
2000-2005	2.0	3.7	-1.5	-5.2	3.7	-1.3	0.1	2.1
2005-2008	3.8	2.9	-0.1	0.0	0.3	2.0	1.6	2.9
2008-2018	2.9	2.3	0.7	-1.0	2.1	1.5	1.3	2.4
2005-2018	3.1	2.4	0.5	-0.8	1.6	1.6	1.3	2.5

**Form 1.1b - SMUD Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Electricity Sales by Sector (GWh)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	TCU	Streetlighting	Total Consumption
1980	2,587	1,994	274	52	111	278	56	5,352
1981	2,794	2,064	278	59	122	322	56	5,695
1982	2,781	2,071	297	58	107	311	58	5,683
1983	2,910	2,102	332	67	94	396	56	5,956
1984	3,086	2,200	420	75	113	415	53	6,362
1985	3,193	2,428	538	79	115	476	56	6,884
1986	3,107	2,543	607	73	102	528	57	7,016
1987	3,229	2,749	636	80	115	552	59	7,419
1988	3,326	2,969	688	39	21	574	60	7,677
1989	3,359	3,046	679	133	98	550	62	7,927
1990	3,611	3,138	721	124	107	589	67	8,358
1991	3,603	3,083	721	133	120	620	68	8,349
1992	3,626	3,208	748	103	131	611	68	8,496
1993	3,636	3,216	734	100	134	547	68	8,435
1994	3,662	3,207	727	110	146	495	71	8,418
1995	3,604	3,268	719	112	140	542	72	8,458
1996	3,808	3,342	768	116	151	547	75	8,805
1997	3,839	3,464	772	119	164	572	75	9,006
1998	3,959	3,437	828	138	122	564	75	9,123
1999	3,966	3,551	849	165	162	553	80	9,326
2000	4,135	3,596	842	167	147	523	81	9,491
2001	4,019	3,511	735	146	145	436	79	9,070
2002	4,087	3,692	778	145	162	441	79	9,383
2003	4,361	3,921	780	125	181	476	80	9,924
2004	4,426	4,070	773	129	190	482	80	10,151
2005	4,554	4,311	781	128	177	490	81	10,523
2006	4,803	4,500	759	121	175	503	83	10,944
2007	4,939	4,605	765	121	176	512	84	11,203
2008	5,086	4,695	779	128	178	520	85	11,471
2009	5,241	4,800	789	131	181	529	86	11,758
2010	5,398	4,908	797	131	184	537	87	12,041
2011	5,570	5,017	807	129	187	546	89	12,345
2012	5,745	5,130	813	127	192	554	90	12,651
2013	5,920	5,244	819	125	196	563	91	12,958
2014	6,096	5,359	821	123	200	571	92	13,262
2015	6,268	5,474	825	121	204	579	93	13,565
2016	6,431	5,589	829	119	209	587	95	13,859
2017	6,587	5,703	833	118	214	594	96	14,145
2018	6,741	5,888	835	116	219	602	97	14,497

**Annual Growth Rates (%)**

1980-1990	3.4	4.6	10.2	9.1	-0.4	7.8	1.8	4.6
1990-2000	1.4	1.4	1.6	3.0	3.2	-1.2	1.9	1.3
2000-2005	2.0	3.7	-1.5	-5.2	3.7	-1.3	0.1	2.1
2005-2008	3.8	2.9	-0.1	0.0	0.3	2.0	1.6	2.9
2008-2018	2.9	2.3	0.7	-1.0	2.1	1.5	1.3	2.4
2005-2018	3.1	2.4	0.5	-0.8	1.6	1.6	1.3	2.5

**Form 1.2 - SMUD Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Net Energy for Load (GWh)**

	Total Consumption	Net Losses	Gross Generation	Private Supply	Net Energy for Load
1980	5,352	343	5,695	0	5,695
1981	5,695	364	6,059	0	6,059
1982	5,683	364	6,047	0	6,047
1983	5,956	381	6,337	0	6,337
1984	6,362	407	6,769	0	6,769
1985	6,884	441	7,325	0	7,325
1986	7,016	449	7,465	0	7,465
1987	7,419	475	7,894	0	7,894
1988	7,677	491	8,168	0	8,168
1989	7,927	507	8,434	0	8,434
1990	8,358	535	8,893	0	8,893
1991	8,349	534	8,884	0	8,884
1992	8,496	544	9,040	0	9,040
1993	8,435	540	8,974	0	8,974
1994	8,418	539	8,957	0	8,957
1995	8,458	541	8,999	0	8,999
1996	8,805	564	9,369	0	9,369
1997	9,006	576	9,583	0	9,583
1998	9,123	584	9,707	0	9,707
1999	9,326	597	9,923	0	9,923
2000	9,491	607	10,098	0	10,098
2001	9,070	580	9,651	0	9,651
2002	9,383	601	9,984	0	9,984
2003	9,924	635	10,559	0	10,559
2004	10,151	650	10,800	0	10,800
2005	10,523	673	11,196	0	11,196
2006	10,944	700	11,644	0	11,644
2007	11,204	717	11,921	2	11,920
2008	11,474	734	12,208	3	12,205
2009	11,762	753	12,514	4	12,511
2010	12,046	771	12,817	5	12,812
2011	12,351	790	13,141	6	13,136
2012	12,658	810	13,468	7	13,461
2013	12,966	829	13,795	8	13,787
2014	13,271	849	14,120	9	14,111
2015	13,575	868	14,443	10	14,433
2016	13,870	887	14,757	11	14,745
2017	14,157	905	15,063	12	15,051
2018	14,510	928	15,438	13	15,424

**Annual Growth Rates (%)**

1980-1990	4.6	4.6	4.6	#DIV/0!	4.6
1990-2000	1.3	1.3	1.3	#DIV/0!	1.3
2000-2005	2.1	2.1	2.1	#DIV/0!	2.1
2005-2008	2.9	2.9	2.9	#DIV/0!	2.9
2008-2018	2.4	2.4	2.4	17.7	2.4
2005-2018	2.5	2.5	2.5	#DIV/0!	2.5

**Form 1.3 - SMUD Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Coincident Peak Demand by Sector (MW)**

Year	Residential	Commercial	Industrial	Agricultural	Other	Total Demand
1980	892	451	47	14	41	1,445
1981	908	478	44	12	42	1,484
1982	783	463	56	14	49	1,365
1983	920	460	58	11	57	1,506
1984	957	489	70	13	58	1,586
1985	977	545	92	14	70	1,698
1986	896	580	93	10	70	1,648
1987	898	608	108	14	82	1,710
1988	1,092	664	100	2	79	1,937
1989	1,003	632	112	10	74	1,831
1990	1,164	650	111	11	77	2,013
1991	1,180	612	107	11	77	1,987
1992	1,033	676	119	14	87	1,929
1993	1,113	651	114	14	76	1,968
1994	1,006	661	121	16	71	1,875
1995	1,123	697	123	15	80	2,039
1996	1,276	691	120	15	75	2,177
1997	1,268	744	128	18	82	2,240
1998	1,363	780	148	14	86	2,390
1999	1,528	766	143	16	77	2,531
2000	1,428	819	135	13	70	2,466
2001	1,367	722	118	14	59	2,279
2002	1,488	836	140	17	68	2,549
2003	1,500	859	131	18	69	2,577
2004	1,322	901	133	20	75	2,451
2005	1,563	934	128	17	71	2,714
2006	1,781	1,006	128	18	76	3,009
2007	1,702	955	119	17	72	2,865
2008	1,753	973	123	17	73	2,938
2009	1,805	992	125	18	74	3,014
2010	1,859	1,012	126	18	75	3,090
2011	1,919	1,032	127	18	76	3,173
2012	1,981	1,053	128	18	77	3,257
2013	2,043	1,074	128	19	79	3,342
2014	2,104	1,096	128	19	80	3,427
2015	2,165	1,117	128	19	81	3,511
2016	2,221	1,138	128	20	82	3,589
2017	2,275	1,160	129	20	83	3,666
2018	2,328	1,199	129	20	84	3,761

**Annual Growth Rates (%)**

1980-1990	2.7	3.7	9.1	-2.6	6.5	3.4
1990-2000	2.1	2.3	2.0	1.8	-0.9	2.0
2000-2005	1.8	2.7	-1.0	5.9	0.4	1.9
2005-2008	3.9	1.3	-1.5	0.5	0.6	2.7
2008-2018	2.9	2.1	0.5	1.7	1.5	2.5
2005-2018	3.1	1.9	0.0	1.4	1.3	2.5

**Form 1.4 - SMUD Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Peak Demand (MW)**

Year	Total End Use Load	Net Losses	Gross Generation	Private Supply	Net Peak Demand	Load Factor (%)
1980	1,445	133	1,578	0	1,578	41.2
1981	1,484	137	1,621	0	1,621	42.7
1982	1,365	126	1,491	0	1,491	46.3
1983	1,506	139	1,645	0	1,645	44.0
1984	1,586	146	1,732	0	1,732	44.6
1985	1,698	156	1,854	0	1,854	45.1
1986	1,648	152	1,800	0	1,800	47.4
1987	1,710	157	1,867	0	1,867	48.3
1988	1,937	178	2,115	0	2,115	44.1
1989	1,831	168	1,999	0	1,999	48.2
1990	2,013	185	2,198	0	2,198	46.2
1991	1,987	183	2,170	0	2,170	46.7
1992	1,929	177	2,106	0	2,106	49.0
1993	1,968	181	2,149	0	2,149	47.7
1994	1,875	172	2,047	0	2,047	49.9
1995	2,039	188	2,227	0	2,227	46.1
1996	2,177	200	2,377	0	2,377	45.0
1997	2,240	206	2,446	0	2,446	44.7
1998	2,390	220	2,610	0	2,610	42.5
1999	2,531	233	2,764	0	2,764	41.0
2000	2,466	227	2,693	0	2,693	42.8
2001	2,279	210	2,489	0	2,489	44.3
2002	2,549	235	2,784	0	2,784	40.9
2003	2,577	237	2,814	0	2,814	42.8
2004	2,451	225	2,677	0	2,677	46.1
2005	2,714	250	2,964	0	2,964	43.1
2006	3,009	277	3,286	0	3,285	40.5
2007	2,865	264	3,129	1	3,128	43.5
2008	2,938	270	3,208	1	3,207	43.5
2009	3,014	277	3,291	2	3,289	43.4
2010	3,090	284	3,374	3	3,371	43.4
2011	3,173	292	3,464	3	3,461	43.3
2012	3,257	299	3,557	4	3,553	43.3
2013	3,342	307	3,649	5	3,645	43.2
2014	3,427	315	3,741	5	3,736	43.1
2015	3,511	322	3,833	6	3,827	43.0
2016	3,589	330	3,919	6	3,913	43.0
2017	3,666	337	4,003	7	3,996	43.0
2018	3,761	345	4,106	8	4,098	43.0

**Annual Growth Rates (%)**

1980-1990	3.4	3.4	3.4		3.4	1.1
1990-2000	2.0	2.0	2.0	#DIV/0!	2.0	-0.8
2000-2005	1.9	1.9	1.9	#DIV/0!	1.9	0.1
2005-2008	2.7	2.7	2.7	#DIV/0!	2.7	0.3
2008-2018	2.5	2.5	2.5	17.7	2.5	-0.1
2005-2018	2.5	2.5	2.5	#DIV/0!	2.5	0.0



**Form 1.7a - SMUD Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Private Supply by Sector (GWh)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	TCU	Streetlighting	Total Consumption
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0	0
1996	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0
1999	0	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0
2001	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0
2003	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0	0
2006	0	0	0	0	0	0	0	0
2007	0	1	0	0	0	0	0	2
2008	0	2	0	0	0	0	0	3
2009	0	3	0	0	0	0	0	4
2010	0	4	0	0	0	0	0	5
2011	0	5	0	0	0	0	0	6
2012	0	6	0	0	0	0	0	7
2013	0	8	0	0	0	0	0	8
2014	0	9	0	0	0	0	0	9
2015	1	10	0	0	0	0	0	10
2016	1	11	0	0	0	0	0	11
2017	1	12	0	0	0	0	0	12
2018	1	13	0	0	0	0	0	13

**Annual Growth Rates (%)**

1980-1990			
1990-2000	#DIV/0!	#DIV/0!	#DIV/0!
2000-2005	#DIV/0!	#DIV/0!	#DIV/0!
2005-2008	#DIV/0!	#DIV/0!	#DIV/0!
2008-2018	17.7	17.7	17.7
2005-2018	#DIV/0!	#DIV/0!	#DIV/0!

**Form 2.2 - SMUD Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Planning Area Economic and Demographic Assumptions**

Year	Population	Households	Persons per Household	Real Personal Income (Millions 2005\$)	Industrial Value Added (Millions 2005\$)
1980	777,293	303,167	2.56	6,561	12,902
1981	780,352	306,447	2.55	6,536	13,204
1982	792,948	309,611	2.56	6,547	12,795
1983	825,773	317,329	2.60	6,899	12,953
1984	854,930	327,533	2.61	7,613	13,620
1985	895,717	345,209	2.59	8,413	13,994
1986	915,570	355,372	2.58	8,869	14,184
1987	931,933	364,140	2.56	9,101	14,790
1988	959,537	374,667	2.56	9,445	15,557
1989	992,208	387,052	2.56	10,003	16,123
1990	1,018,433	396,134	2.57	10,100	16,469
1991	1,051,318	407,886	2.58	10,136	15,937
1992	1,068,645	415,085	2.57	10,373	15,878
1993	1,083,913	421,153	2.57	10,358	15,868
1994	1,090,144	427,082	2.55	10,637	15,791
1995	1,095,152	432,887	2.53	10,946	16,659
1996	1,109,749	438,011	2.53	11,038	16,411
1997	1,123,820	440,189	2.55	11,469	17,471
1998	1,140,219	443,015	2.57	12,232	17,603
1999	1,179,070	449,589	2.62	12,980	17,030
2000	1,205,262	455,082	2.65	13,886	17,401
2001	1,244,399	464,328	2.68	14,497	15,249
2002	1,277,086	474,665	2.69	14,815	14,711
2003	1,306,035	485,515	2.69	15,290	14,289
2004	1,330,520	496,370	2.68	15,925	15,022
2005	1,350,741	507,416	2.66	16,470	15,308
2006	1,386,656	520,134	2.67	17,350	15,553
2007	1,422,571	532,814	2.67	18,466	15,731
2008	1,458,487	545,455	2.67	19,700	16,000
2009	1,494,400	558,057	2.68	20,984	16,215
2010	1,530,317	570,622	2.68	22,242	16,364
2011	1,569,400	584,326	2.69	23,550	16,562
2012	1,608,483	597,989	2.69	24,840	16,660
2013	1,647,567	611,610	2.69	26,106	16,794
2014	1,686,650	625,190	2.70	27,391	16,837
2015	1,725,732	638,727	2.70	28,666	16,930
2016	1,764,815	652,222	2.71	29,868	16,996
2017	1,803,898	665,677	2.71	30,989	17,050
2018	1,842,980	679,089	2.71	32,088	17,056

**Annual Growth Rates (%)**

1980-1990	2.7	2.7	0.0	4.4	2.5
1990-2000	1.7	1.4	0.3	3.2	0.6
2000-2005	2.3	2.2	0.1	3.5	-2.5
2005-2008	2.6	2.4	0.1	6.2	1.5
2008-2018	2.4	2.2	0.1	5.0	0.6
2005-2018	2.4	2.3	0.1	5.3	0.8

# CHAPTER 6: LOS ANGELES DEPARTMENT OF WATER AND POWER PLANNING AREA

The Los Angeles Department of Water and Power (LADWP) planning area includes LADWP bundled retail customers and customers served by any energy service providers (ESPs) using the LADWP distribution system to deliver electricity to end users.

This chapter is organized similar to previous chapters. First, forecasted consumption and peak loads for the LADWP planning area are discussed; both total and per capita values are presented. The draft CED 2008 values are compared to the CED 2006 forecast; significant differences between the two forecasts are explained. The forecasted load factor, jointly determined by the consumption and peak load estimates, is also discussed. Second, sector consumption and peak load forecasts are presented. The residential, commercial, industrial and “other” sector forecasts are compared to those in CED 2006; again, significant differences between the two are discussed.

## Forecast Results

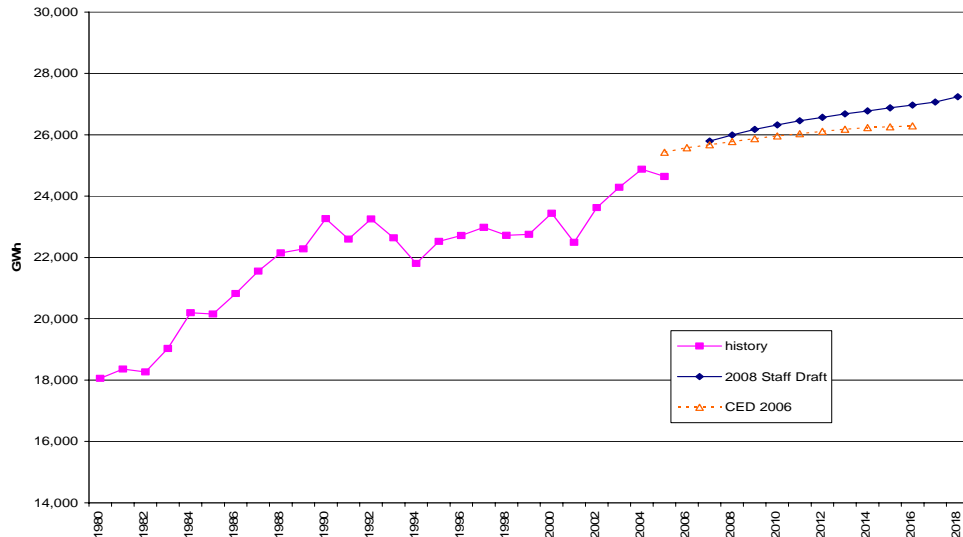
Table 6-1 presents a comparison of electricity consumption and peak demand for selected years. Figures 6-1 and 6-2 present a graphical comparison of the annual energy consumption and peak demand forecasts, respectively.

**Table 6-1: LADWP Planning Area Forecast Comparison**

	Consumption (GWH)			Peak (MW)		
	CED 2006	Staff Draft	Percent Difference Staff Draft/CED 2006	CED 2006	Staff Draft	Percent Difference Staff Draft/CED 2006
1990	23,263	23,263	0.00%	5,281	5,326	0.86%
2000	23,296	23,437	0.61%	5,330	5,325	-0.08%
2005	25,428	24,639	-3.11%	5,744	5,725	-0.33%
2008	25,778	25,989	0.82%	5,819	5,872	0.91%
2013	26,178	26,683	1.93%	5,903	6,005	1.74%
2016	26,289	26,968	2.58%	5,927	6,063	2.28%
Annual Average Growth Rates						
1990-2000	0.01%	0.07%		0.09%	0.00%	
2000-2005	1.77%	1.00%		1.51%	1.46%	
2005-2008	0.46%	1.79%		0.43%	0.85%	
2008-2016	0.25%	0.46%		0.23%	0.40%	
Historic values are shaded						

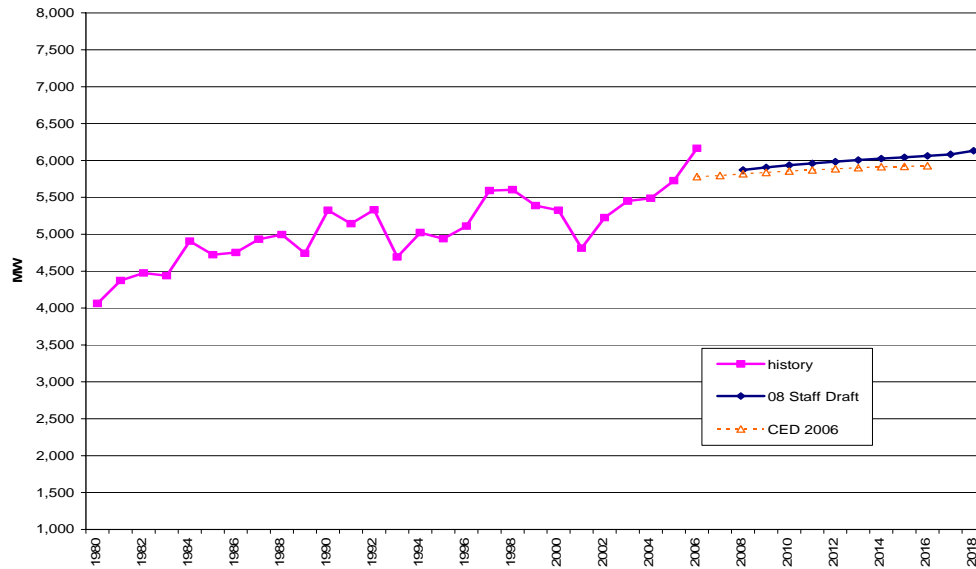
As shown in Figure 6-1, the draft CED 2008 electricity consumption forecast begins from a similar starting point as the CED 2006 forecast. However, the growth rate of the draft CED 2008 forecast is higher than the CED 2006 forecast due to higher forecasted household income and population growth projections and increased projections of commercial square footage. This results in the draft CED 2008 forecast being about 2.5 percent higher than the CED 2006 forecast at the end of the planning horizon.

**Figure 6-1: LADWP Planning Area Electricity Forecast**



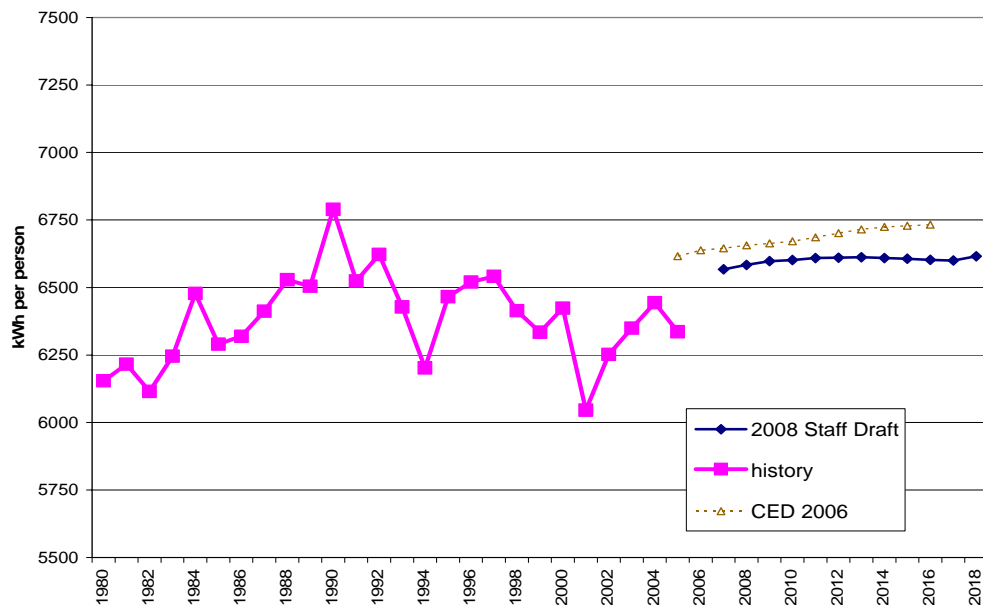
The difference in LADWP planning area peak demand forecasts, shown in Figure 6-2, is similar to that of the electricity consumption forecast. The difference in peak forecasts are driven by the underlying consumption forecast differences.

**Figure 6-2: LADWP Planning Area Peak**



Figures 6-3 provides comparisons of LADWP planning area per capita electricity consumption between the draft CED 2008 and CED 2006 forecasts. Per capita consumption in the draft CED 2008 forecast is lower throughout the forecast period than that projected in the CED 2006 forecast. Projected per capita use is forecasted to remain relatively constant over the forecast period in the draft CED 2008 forecast rather than the increase that was projected in CED 2006.

**Figure 6-3: LADWP Planning Area per Capita Electricity Consumption**



Per capita peak demand, shown in Figure 6-4, is slightly lower than projected in the CED 2006 forecast. The draft CED 2008 projection remains constant over the forecast period.

**Figure 6-4: LADWP Planning Area per Capita Peak Demand**

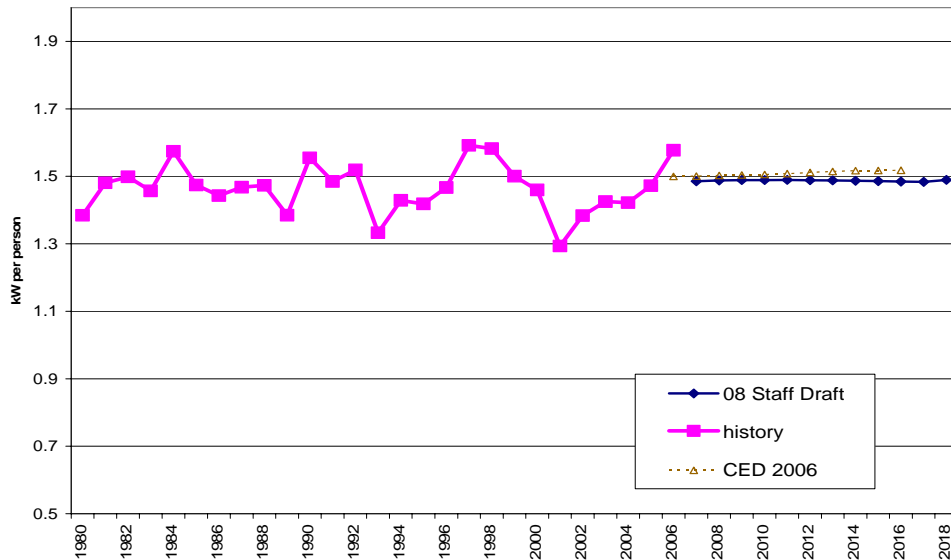
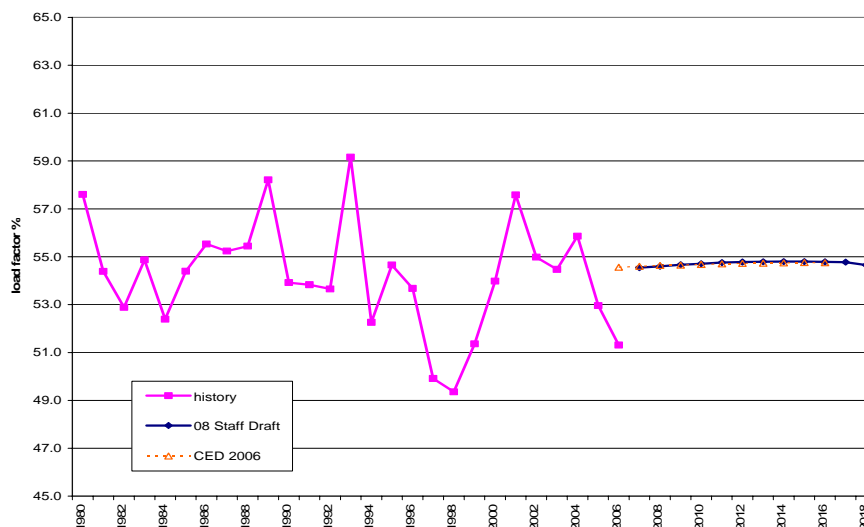


Figure 6-5 provides a comparison of the respective load factors. The load factor is a measure of the relative increase in peak demand with respect to annual electricity consumption. The draft CED 2006 projected load factor is relatively constant over the forecast period. This is unchanged from the previous forecast.

**Figure 6-5: LADWP Planning Area Load Factor**



## Sector Level Results and Input Assumptions

### *Residential*

Figure 6-6 provides a comparison between the draft CED 2008 and CED 2006 LADWP planning area residential forecasts. The draft CED 2008 forecast is higher over the forecast period than the CED 2006 forecast due to an increase in the projections of households and household income.

**Figure 6-6: LADWP Planning Area Residential Consumption**

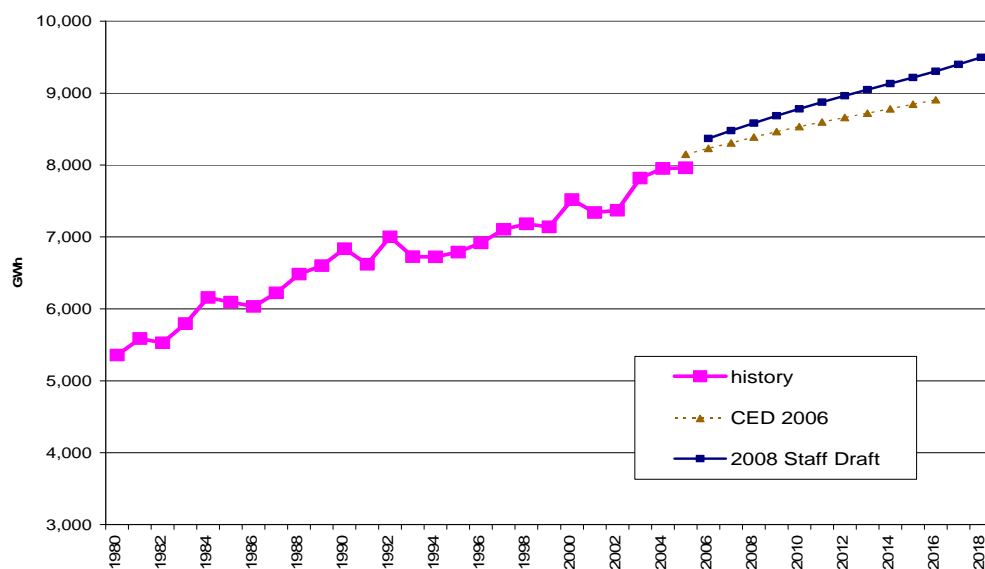
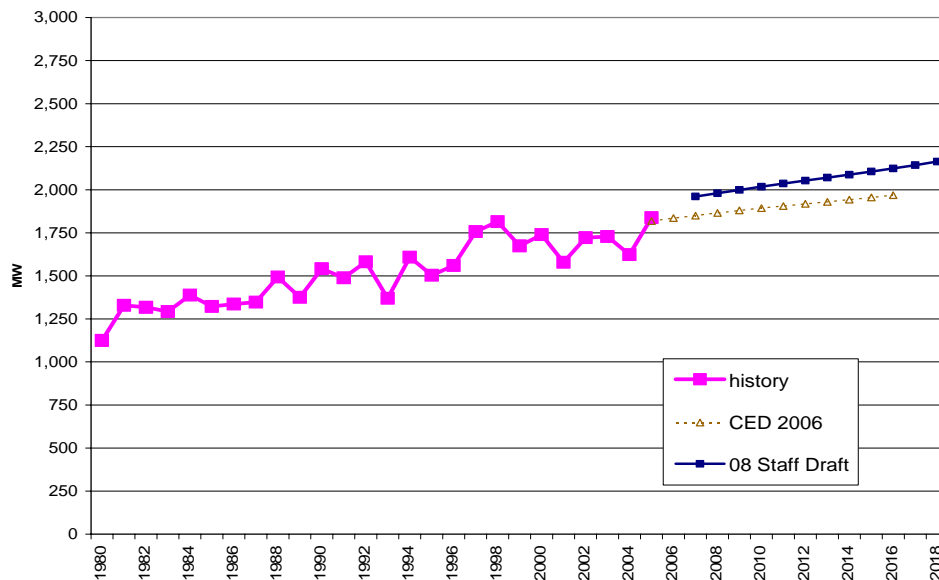


Figure 6-7 provides a comparison of the draft CED 2008 and CED 2006 residential peak demand forecasts. The peak forecast differences mirror the difference in electricity consumption forecasts. Other than the difference in starting value, the growth rates of the two forecasts are very similar.

**Figure 6-7: LADWP Planning Area Residential Peak**



Figures 6-8 and 6-9 compare the residential drivers used in the draft CED 2008 forecast with those used in CED 2006. For this forecast, staff revised the process allocating Los Angeles County population, housing, and income data to the five utility service areas providing electricity within the county—SCE; the cities of Burbank, Glendale, and Pasadena; and LADWP. Previously unavailable sources of information, such as websites for the cities of Glendale and Los Angeles, and the County of Los Angeles, provided substantial insight into population shifts within the area. The result of this revision is to allocate slightly less of the county's population to LADWP, but a higher proportion of homes to the warmer valley area and less in the coastal region. Also, a higher proportion of the county's personal income is assumed for the residents of Burbank, Glendale, and Pasadena.

Figure 6-8 provides comparisons of total population, total households and persons per household projections. The draft CED 2008 forecast of total population is higher throughout the forecast period than the CED 2006 forecast due to continued high population growth seen in the LADWP planning area.

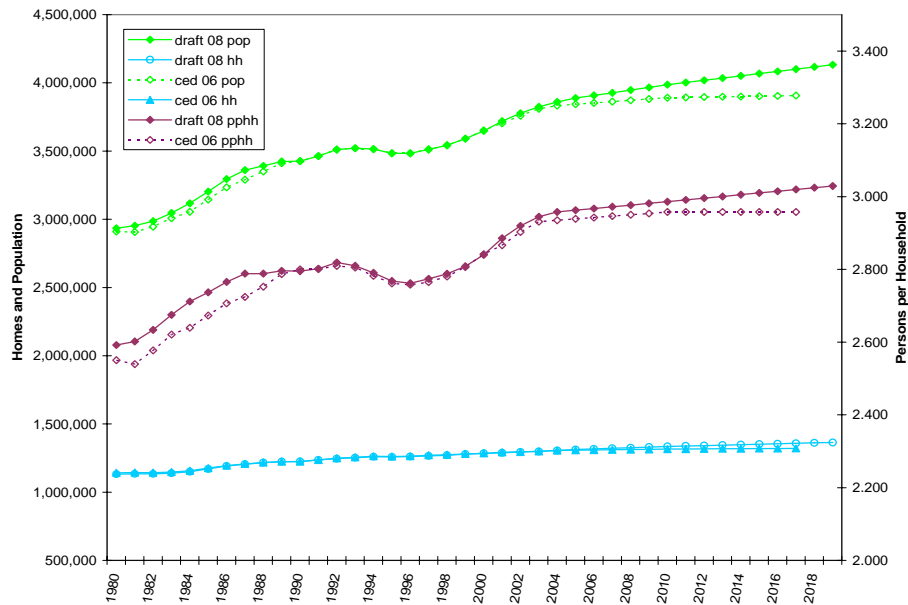
Staff's draft CED 2008 projections of persons per household are higher than for the CED 2006 forecast, based on recent higher estimates provided by the DOF E5-A reports. Staff has reduced previous assumptions of increasing persons per household to a rate approximately half of the increase seen in the 1990-2000 period. This yields a forecast of household growth that is very similar to the CED 2006 forecast.

Figure 6-9 provides a comparison of household income between the two forecasts. Household income is derived as the product of per capita income and persons per household. The draft CED 2008 projection is higher throughout the forecast period, reflecting a more confident economic outlook than in the CED 2006. The higher



persons per household forecast is another factor. This higher household income serves to increase the residential forecast.

**Figure 6-8: LADWP Planning Area Residential Demographic Projections**



**Figure 6-9: LADWP Planning Area Household Income Projections**

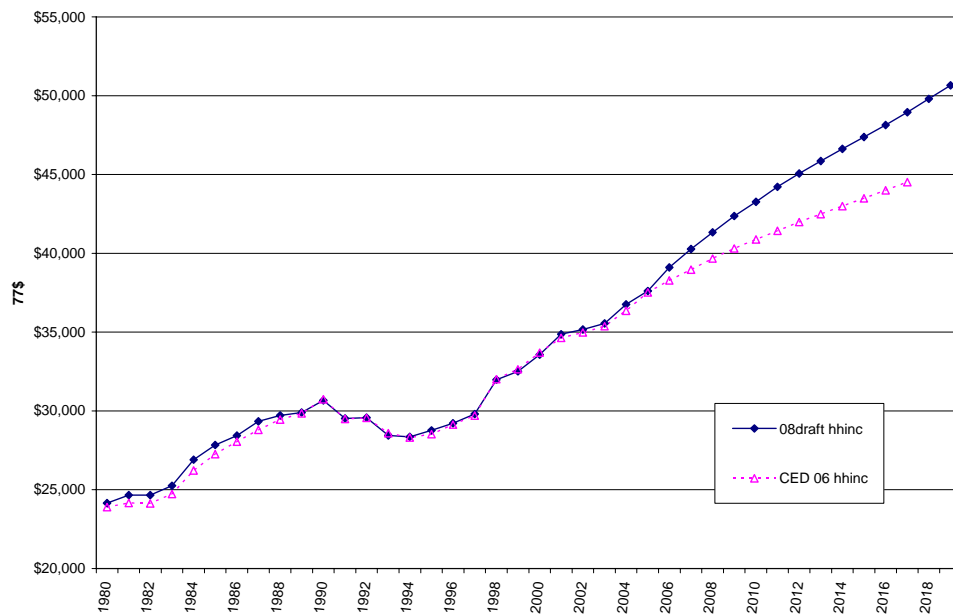
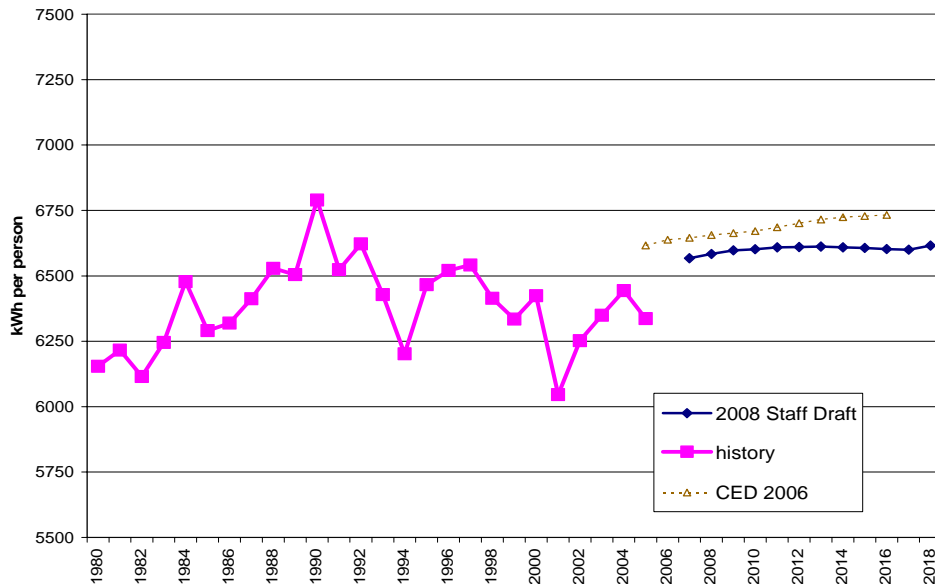
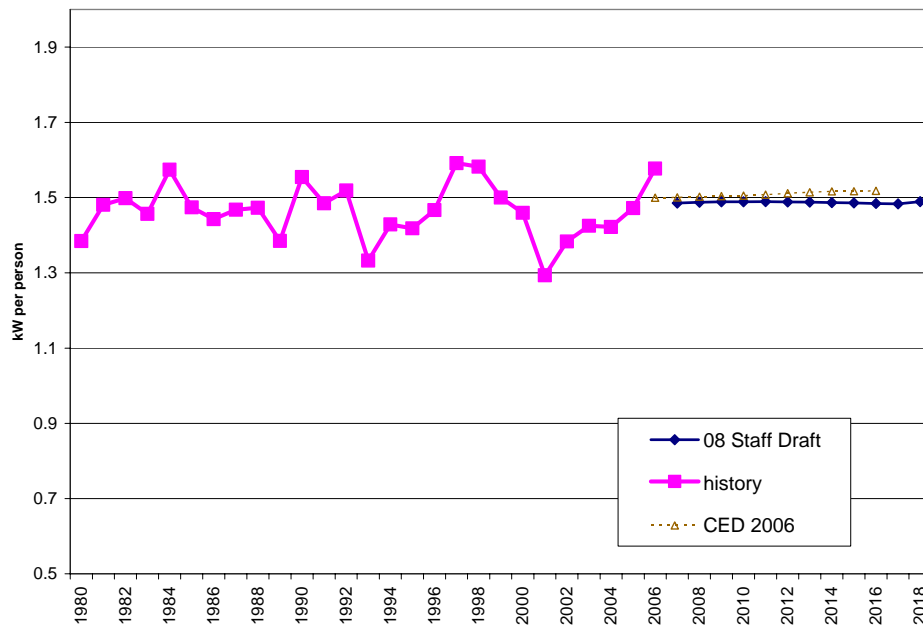


Figure 6-10 presents a comparison of electricity use per household between the two forecasts as well as the 1980-2005 historic series. The draft CED 2008 forecast of use per household is relatively constant over the forecast period compared with the slight increase of the previous forecast. The draft CED 2008 forecast is lower than the CED 2006 forecast, primarily because of a higher saturation of more efficient air conditioners throughout the LADWP service area. Peak use per household, as seen in Figure 6-11, is less than the difference for energy. The reason is the reduced effect of air conditioning savings at peak, while the population growth rate is still higher than the growth in peak demand.

**Figure 6-10: LADWP Planning Area Use per Household**



**Figure 6-11: LADWP Planning Area Peak Use per Household**



## Commercial Building Sector

Figure 6-12 provides a comparison of the commercial building sector forecasts. The draft CED 2008 forecast is higher throughout the entire forecast. This is primarily due to higher projections of commercial floor space. The draft CED 2008 commercial building electricity consumption growth rate is also higher than the CED 200 forecast because the increased floor space estimates offset savings from various iterations of the commercial building and appliance standards enacted from 1998 to 2005.

**Figure 6-12: LADWP Planning Area Commercial Consumption**

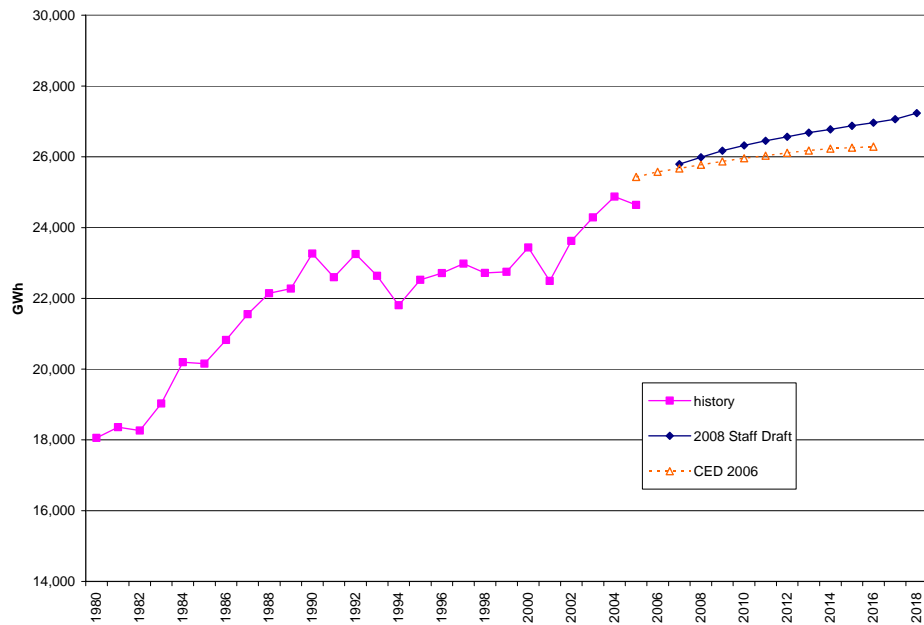
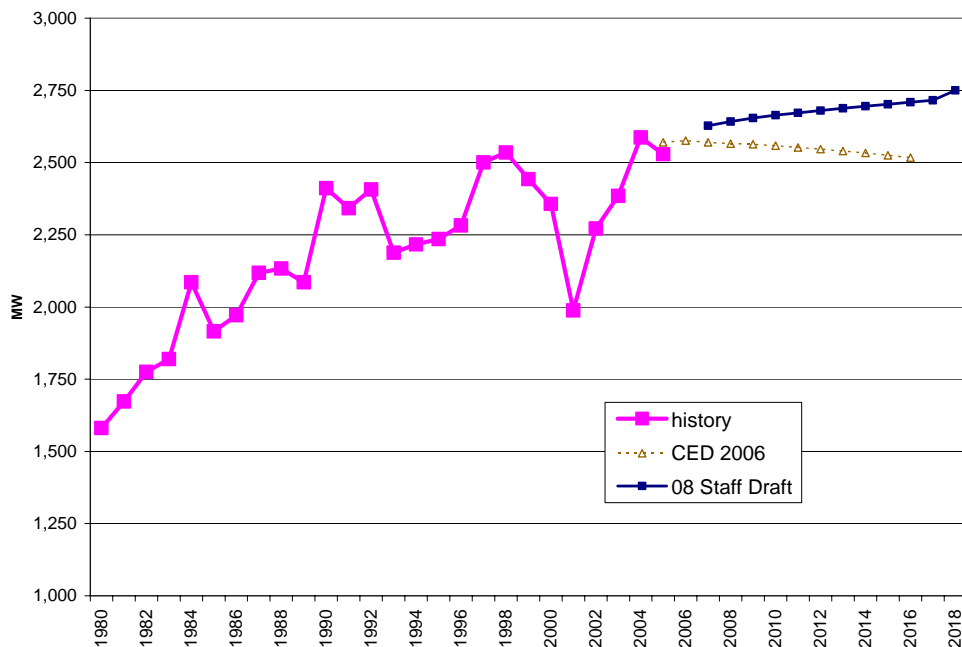


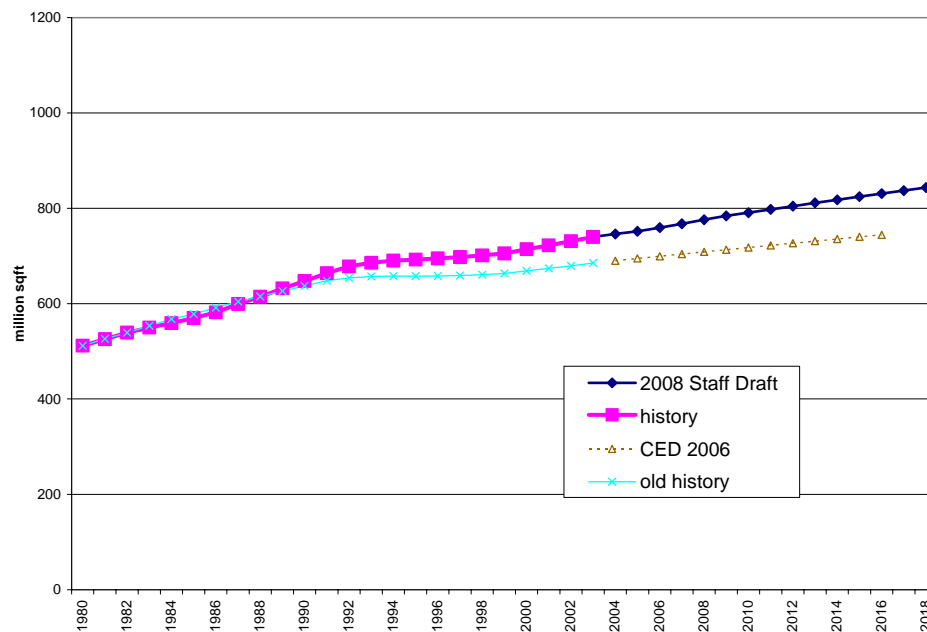
Figure 6-13 provides a comparison of the commercial peak demand forecasts. The draft CED 2006 forecast is higher throughout the forecast period due to a higher starting value. The difference in peak forecasts is primarily due to the difference in electricity consumption forecasts.

**Figure 6-13: LADWP Planning Area Commercial Sector Peak**



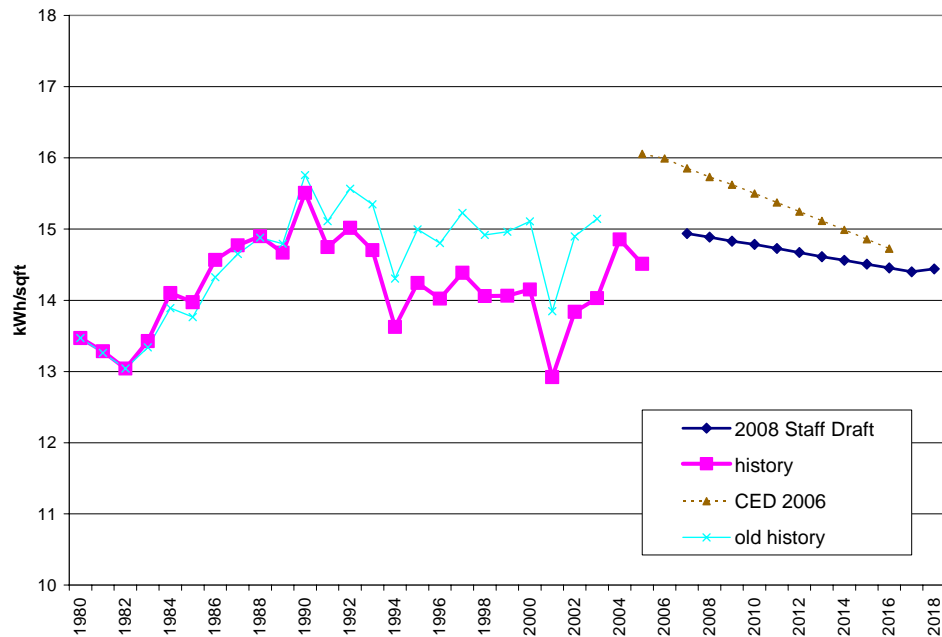
In staff's commercial building sector forecasting model, floorspace by building type (for example, retail, offices, and schools) is the key driver of energy demand trends. The commercial building floorspace forecast is based on the historic trend of additions in the LADWP planning area. Figure 6-14 provides a comparison of total commercial floorspace projections. For the LADWP planning area the draft CED 2006 floorspace projections and historic estimates are higher than the CED 2006 floorspace projections because of methodology changes in estimation discussed in Chapter 1.

**Figure 6-14: LADWP Planning Area Commercial Floorspace**

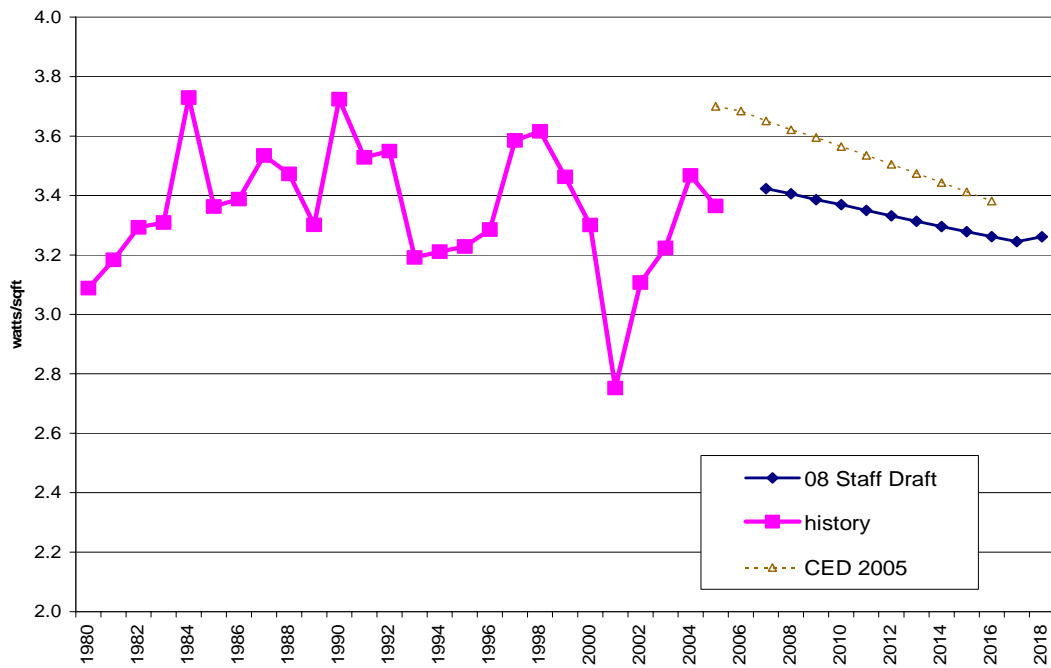


This higher floor space projection is somewhat offset by a decline in projected use per square foot over the forecast period, shown in Figures 6-15 and 6-16. This decline is a result of an increasing proportion of new floor space with more efficient end use intensities. Commercial consumption per square foot, in terms of both energy and peak, decreases sharply in the forecast period of the draft CED 2008.

**Figure 6-15: LADWP Planning Area Commercial kWh per Square Foot**



**Figure 6-16: LADWP Planning Area Commercial Watts per Square Foot**



## Industrial Sector

Figure 6-17 provides comparisons of the LADWP planning area industrial sector electricity consumption forecasts. The draft CED 2008 industrial electricity consumption forecast declines over the forecast period, in contrast to the increase projected in the previous forecast. This is a result of lower industrial sector economic drivers used in the current forecast.

**Figure 6-17: LADWP Planning Area Industrial Consumption**

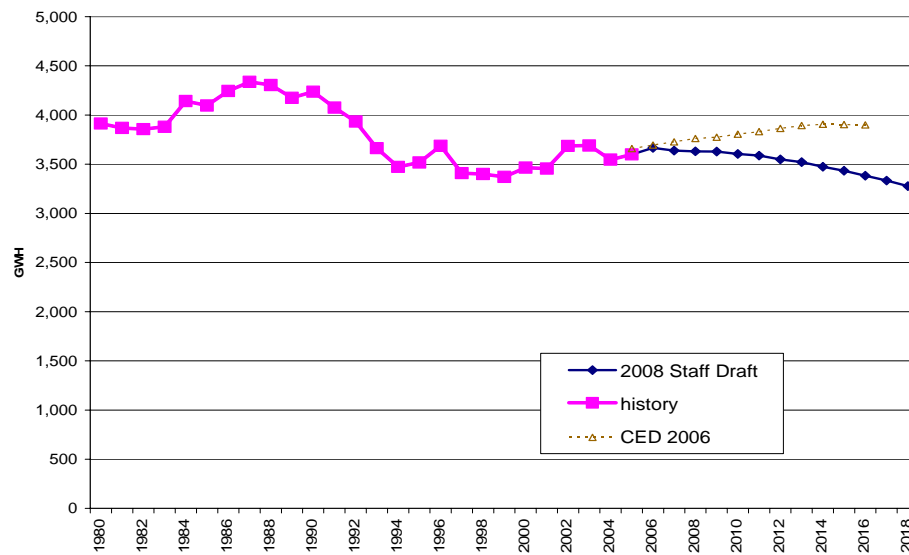


Figure 6-18 provides a comparison of the industrial sector peak forecasts. The differences in peak forecasts are driven by the energy forecast differences.

**Figure 6-18: LADWP Planning Area Industrial Sector Peak**

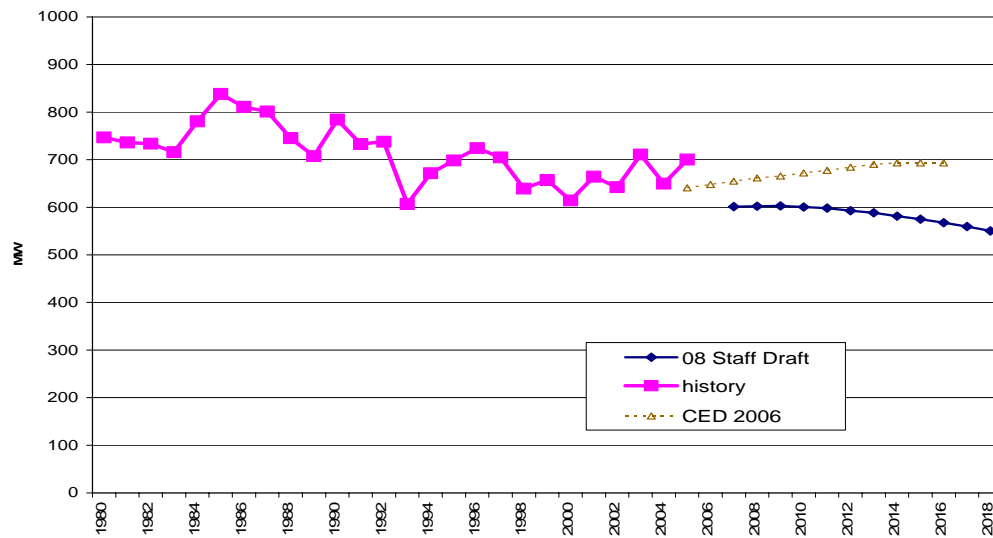
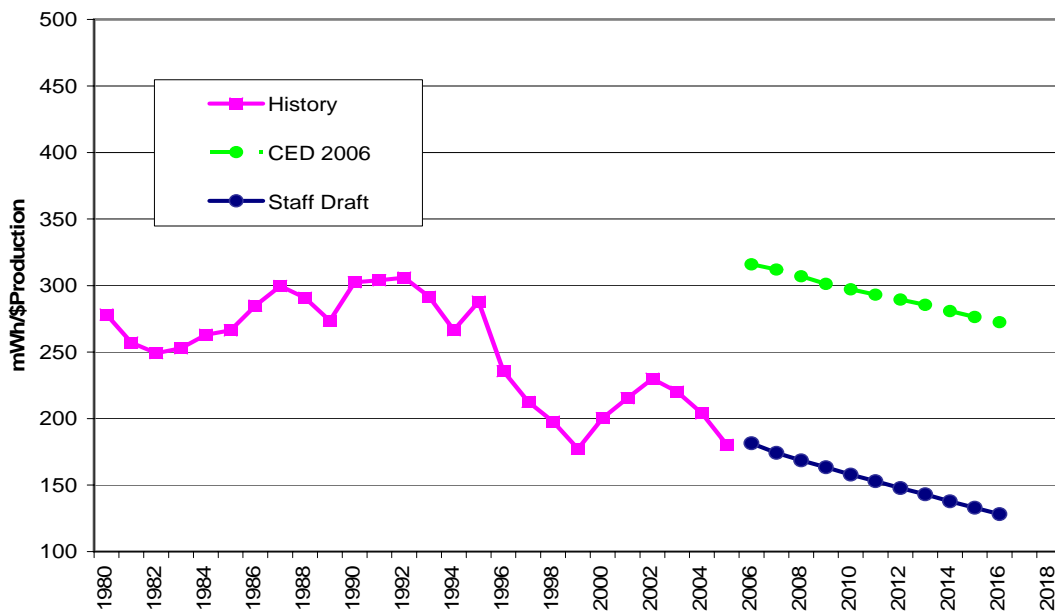


Figure 5-19 provides a comparison of use per dollar value of production between the draft CED 2008 and CED 2006 forecasts. The difference in starting points is a reflection of revised historic industrial production estimates provided by Economy.com. Both forecasts decline at similar rates.

**Figure 6-19: LADWP Planning Area Industrial Use per Production Unit**

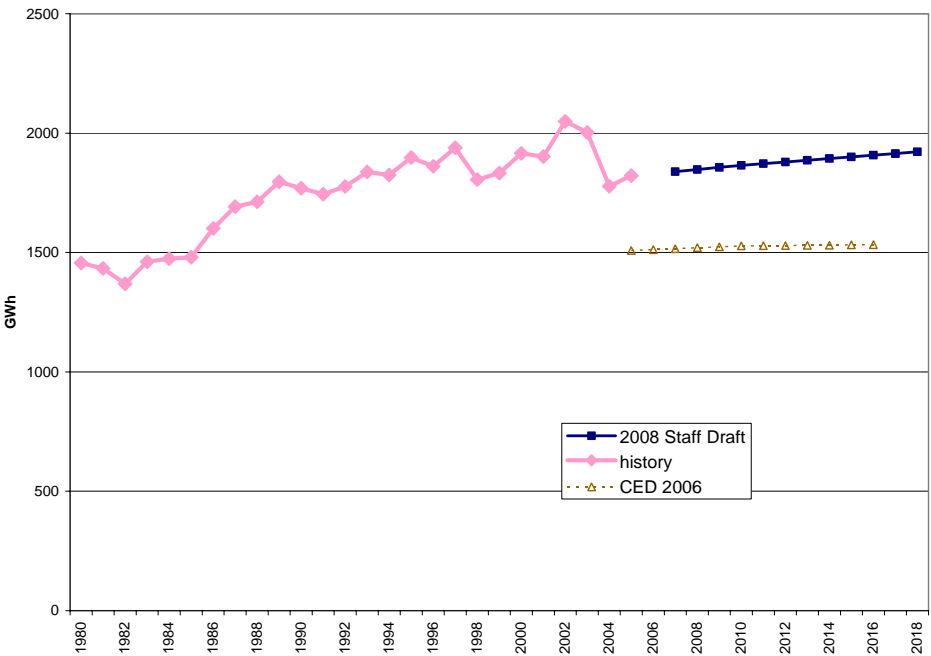




## ***Other Sectors***

Figures 6-20 and 6-21 provide comparisons of the remaining sector electricity consumption forecasts. Figure 6-20 provides a comparison of the transportation, communication, and utilities sector forecasts. The draft CED 2008 transportation, communication, and utilities forecast is higher than the CED 2006 forecast due to an increased historic starting point. Differences in starting points are caused by the reallocation of unclassified sales to sectors in the current forecast. The growth rates of the two forecasts are similar. Figure 6-21 provides comparisons of the agriculture and water pumping (ag & water pumping) and mining and oil extraction sector forecasts. The draft CED 2008 mining and oil extraction forecast is projected to decline over the forecast period while the agriculture and water pumping forecast is projected to increase. The decrease in the mining and oil extraction industry is due to projected decreases in available supply. The increase in the agriculture and water pumping sector is caused by increased water demands. The previous forecasts had very different starting points related to problems with correct classification of electricity sales to the proper sectors.

**Figure 6-20: LADWP Planning Area Transportation, Communication, and Utilities Sector Electricity Consumption**



**Figure 6-21: LADWP Planning Area Agriculture & Water Pumping and Mining & Oil Extraction Electricity Consumption Forecasts**

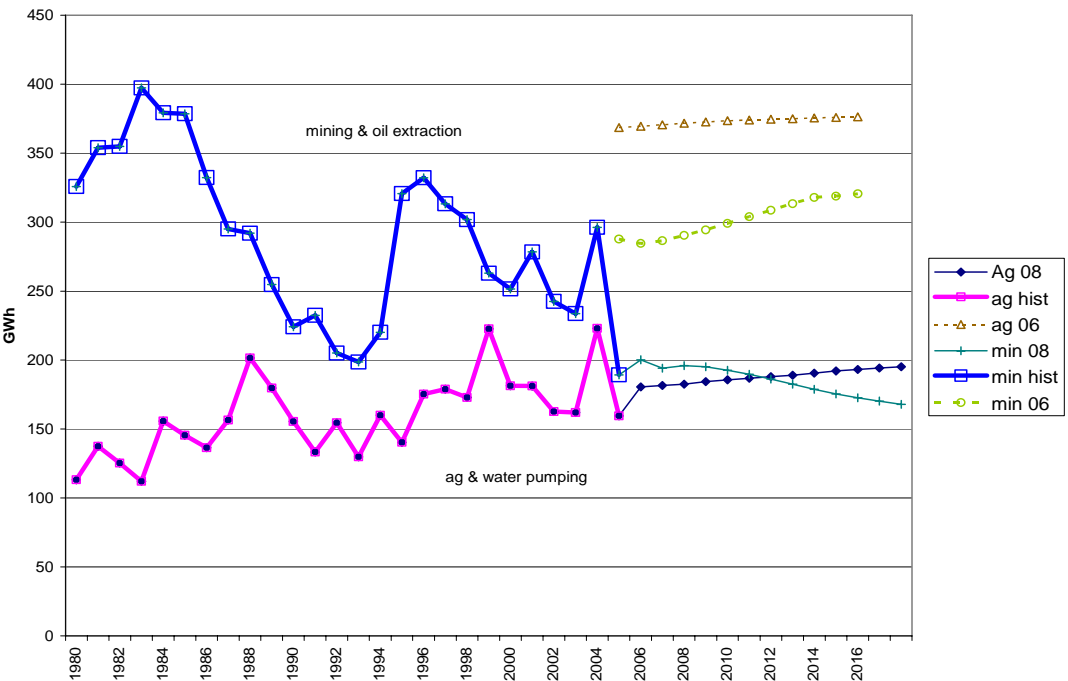
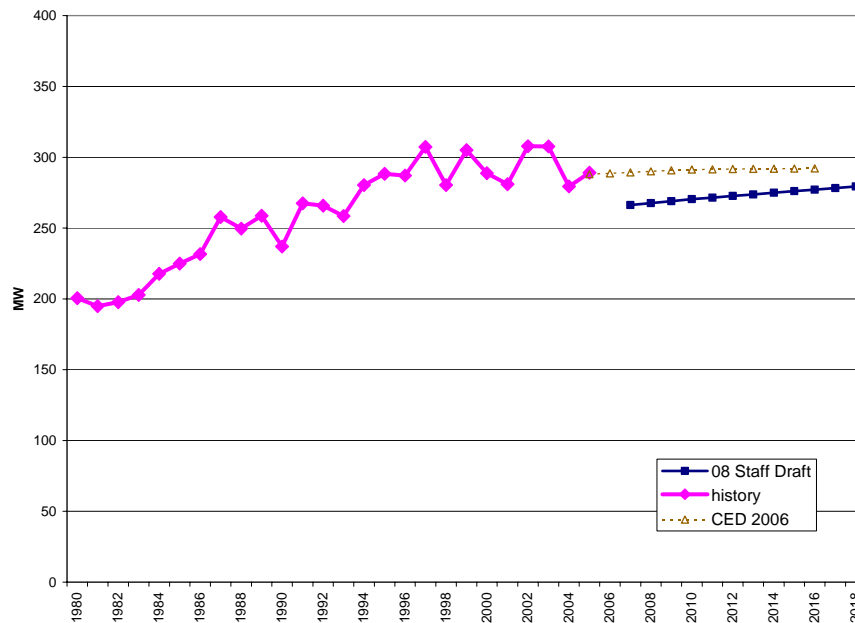


Figure 6-22 provides a comparison of the combined Other Sector peaks for the draft CED 2008 and CED 2006 forecasts. The draft CED 2008 forecast starts at a lower historic point. The projected growth of the draft CED 2008 forecast increases slightly while the CED 2006 forecast was relatively constant.

**Figure 6-22: LADWP Planning Area Other Sector Peak**



## Electricity Prices

Pending the results of the forthcoming electricity price workshop, the draft CED 2008 forecast used prices which are held constant (in real terms) at the 2005 level for all sectors. This is in contrast to the declining price forecast which was used in the CED 2006 price forecast.

## Self-Generation

As discussed in Chapter 1, the peak demand forecast is reduced by the projected effects of the SGIP and CSI programs. Both programs are forecast based on recent trend of installations. The resulting forecast of cumulative peak impacts is shown as "Private Supply" in Forms 1.2 and 1.4 following this chapter.

**Form 1.1 - LADWP Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Electricity Consumption by Sector (GWh)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	TCU	Streetlighting	Total Consumption
1980	5,357	6,894	3,914	326	113	1,113	343	18,059
1981	5,587	6,979	3,869	354	137	1,083	350	18,359
1982	5,529	7,032	3,855	355	125	1,023	346	18,265
1983	5,794	7,383	3,881	397	112	1,119	343	19,029
1984	6,157	7,886	4,142	379	156	1,146	328	20,195
1985	6,092	7,960	4,096	379	145	1,172	309	20,152
1986	6,033	8,475	4,245	332	137	1,298	303	20,822
1987	6,222	8,850	4,337	295	157	1,395	297	21,552
1988	6,482	9,151	4,304	292	202	1,415	297	22,143
1989	6,601	9,268	4,175	255	180	1,505	292	22,276
1990	6,835	10,042	4,237	224	156	1,479	290	23,263
1991	6,620	9,791	4,075	232	133	1,452	292	22,595
1992	7,000	10,183	3,934	205	155	1,487	290	23,253
1993	6,726	10,080	3,663	199	130	1,548	289	22,635
1994	6,723	9,405	3,473	220	160	1,535	289	21,805
1995	6,788	9,862	3,517	321	140	1,607	290	22,526
1996	6,917	9,744	3,686	332	175	1,569	292	22,715
1997	7,106	10,035	3,409	313	179	1,643	296	22,980
1998	7,183	9,857	3,399	302	173	1,509	296	22,719
1999	7,140	9,922	3,371	263	223	1,549	284	22,751
2000	7,519	10,105	3,466	252	181	1,631	284	23,437
2001	7,339	9,334	3,456	278	181	1,603	298	22,489
2002	7,370	10,115	3,686	242	163	1,763	287	23,626
2003	7,818	10,379	3,690	234	162	1,697	305	24,285
2004	7,951	11,081	3,547	296	223	1,466	311	24,875
2005	7,961	10,908	3,599	189	160	1,508	314	24,639
2006	8,369	11,402	3,666	200	180	1,515	315	25,648
2007	8,478	11,465	3,638	194	182	1,523	316	25,796
2008	8,582	11,550	3,631	196	183	1,531	317	25,989
2009	8,685	11,625	3,627	195	184	1,538	318	26,173
2010	8,781	11,691	3,605	193	186	1,546	319	26,319
2011	8,874	11,747	3,587	190	187	1,552	320	26,456
2012	8,963	11,804	3,550	186	188	1,558	320	26,569
2013	9,048	11,857	3,521	182	189	1,565	321	26,683
2014	9,133	11,909	3,474	179	190	1,571	322	26,778
2015	9,218	11,958	3,433	175	192	1,577	323	26,876
2016	9,305	12,007	3,383	173	193	1,584	324	26,968
2017	9,398	12,054	3,334	170	194	1,590	324	27,065
2018	9,496	12,179	3,277	168	195	1,596	325	27,237

**Annual Growth Rates (%)**

1980-1990	2.5	3.8	0.8	-3.7	3.2	2.9	-1.7	2.6
1990-2000	1.0	0.1	-2.0	1.2	1.5	1.0	-0.2	0.1
2000-2005	1.2	1.5	0.8	-5.5	-2.5	-1.6	2.0	1.0
2005-2008	2.5	1.9	0.3	1.2	4.6	0.5	0.3	1.8
2008-2018	1.0	0.5	-1.0	-1.5	0.7	0.4	0.3	0.5
2005-2018	1.4	0.9	-0.7	-0.9	1.6	0.4	0.3	0.8

**Form 1.1b - LADWP Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Electricity Sales by Sector (GWh)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	TCU	Streetlighting	Total Consumption
1980	5,357	6,894	3,914	326	113	1,113	343	18,059
1981	5,587	6,979	3,869	354	137	1,083	350	18,359
1982	5,529	7,032	3,855	355	125	1,023	346	18,265
1983	5,794	7,383	3,649	397	112	1,119	343	18,797
1984	6,157	7,886	3,792	379	156	1,146	328	19,845
1985	6,092	7,960	3,768	379	145	1,172	309	19,824
1986	6,033	8,475	3,839	332	137	1,254	303	20,372
1987	6,222	8,838	3,929	295	157	1,292	297	21,030
1988	6,482	9,131	3,699	292	202	1,274	297	21,377
1989	6,601	9,241	3,392	255	180	1,348	292	21,308
1990	6,835	10,004	3,366	224	156	1,291	290	22,166
1991	6,620	9,736	3,090	232	133	1,264	292	21,368
1992	7,000	10,118	3,001	205	155	1,313	290	22,081
1993	6,726	10,013	2,707	199	130	1,368	289	21,432
1994	6,723	9,121	2,402	220	160	1,342	289	20,258
1995	6,788	9,527	2,395	321	140	1,379	290	20,839
1996	6,917	9,471	2,504	332	175	1,476	292	21,168
1997	7,106	9,735	2,369	313	179	1,544	296	21,541
1998	7,183	9,555	2,359	302	173	1,478	296	21,346
1999	7,140	9,618	2,290	263	223	1,539	284	21,357
2000	7,519	9,810	2,515	252	181	1,625	284	22,186
2001	7,339	9,102	2,580	278	181	1,603	298	21,381
2002	7,370	9,849	2,558	242	163	1,710	287	22,180
2003	7,818	10,089	2,609	234	162	1,697	305	22,914
2004	7,951	10,832	2,581	296	223	1,466	311	23,661
2005	7,961	10,653	2,619	189	160	1,508	314	23,403
2006	8,369	11,146	2,686	200	180	1,515	315	24,411
2007	8,478	11,207	2,658	194	182	1,523	316	24,557
2008	8,581	11,288	2,650	196	183	1,531	317	24,746
2009	8,684	11,358	2,647	195	184	1,538	318	24,924
2010	8,780	11,417	2,624	193	186	1,546	319	25,064
2011	8,873	11,464	2,607	190	187	1,552	320	25,192
2012	8,962	11,511	2,569	186	188	1,558	320	25,294
2013	9,046	11,552	2,541	182	189	1,565	321	25,397
2014	9,131	11,591	2,494	179	190	1,571	322	25,478
2015	9,216	11,625	2,453	175	192	1,577	323	25,562
2016	9,303	11,658	2,402	173	193	1,584	324	25,636
2017	9,396	11,687	2,354	170	194	1,590	324	25,715
2018	9,494	11,792	2,296	168	195	1,596	325	25,867

**Annual Growth Rates (%)**

1980-1990	2.5	3.8	-1.5	-3.7	3.2	1.5	-1.7	2.1
1990-2000	1.0	-0.2	-2.9	1.2	1.5	2.3	-0.2	0.0
2000-2005	1.2	1.7	0.8	-5.5	-2.5	-1.5	2.0	1.1
2005-2008	2.5	2.0	0.4	1.2	4.6	0.5	0.3	1.9
2008-2018	1.0	0.4	-1.4	-1.5	0.7	0.4	0.3	0.4
2005-2018	1.4	0.8	-1.0	-0.9	1.6	0.4	0.3	0.8

**Form 1.2 - LADWP Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Net Energy for Load (GWh)**

	Total Consumption	Net Losses	Gross Generation	Private Supply	Net Energy for Load
1980	18,059	2,438	20,497	0	20,497
1981	18,359	2,479	20,838	0	20,838
1982	18,265	2,466	20,731	0	20,731
1983	19,029	2,538	21,567	232	21,334
1984	20,195	2,679	22,874	350	22,524
1985	20,152	2,676	22,829	328	22,500
1986	20,822	2,750	23,572	450	23,122
1987	21,552	2,839	24,391	522	23,869
1988	22,143	2,886	25,029	766	24,263
1989	22,276	2,877	25,152	968	24,184
1990	23,263	2,992	26,255	1,097	25,159
1991	22,595	2,885	25,480	1,227	24,253
1992	23,253	2,981	26,234	1,172	25,062
1993	22,635	2,893	25,529	1,204	24,325
1994	21,805	2,735	24,540	1,548	22,993
1995	22,526	2,813	25,339	1,686	23,653
1996	22,715	2,858	25,573	1,548	24,025
1997	22,980	2,908	25,888	1,439	24,449
1998	22,719	2,882	25,601	1,373	24,228
1999	22,751	2,883	25,635	1,395	24,240
2000	23,437	2,995	26,433	1,251	25,181
2001	22,489	2,886	25,375	1,108	24,268
2002	23,626	2,994	26,620	1,446	25,174
2003	24,285	3,093	27,378	1,371	26,007
2004	24,875	3,194	28,070	1,214	26,856
2005	24,639	3,159	27,798	1,236	26,562
2006	25,648	3,295	28,943	1,236	27,707
2007	25,796	3,315	29,111	1,239	27,872
2008	25,989	3,341	29,329	1,243	28,087
2009	26,173	3,365	29,538	1,248	28,289
2010	26,319	3,384	29,703	1,255	28,448
2011	26,456	3,401	29,857	1,264	28,593
2012	26,569	3,415	29,984	1,274	28,709
2013	26,683	3,429	30,112	1,286	28,825
2014	26,778	3,440	30,217	1,300	28,918
2015	26,876	3,451	30,327	1,315	29,012
2016	26,968	3,461	30,429	1,331	29,097
2017	27,065	3,472	30,537	1,350	29,187
2018	27,237	3,492	30,729	1,369	29,359

**Annual Growth Rates (%)**

1980-1990	2.6	2.1	2.5	#DIV/0!	2.1
1990-2000	0.1	0.0	0.1	1.3	0.0
2000-2005	1.0	1.1	1.0	-0.3	1.1
2005-2008	1.8	1.9	1.8	0.2	1.9
2008-2018	0.5	0.4	0.5	1.0	0.4
2005-2018	0.8	0.8	0.8	0.8	0.8

**Form 1.3 - LADWP Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Coincident Peak Demand by Sector (MW)**

Year	Residential	Commercial	Industrial	Agricultural	Other	Total Demand
1980	1,125	1,581	747	8	192	3,653
1981	1,329	1,673	736	10	185	3,933
1982	1,317	1,776	734	11	187	4,024
1983	1,292	1,820	716	9	194	4,031
1984	1,388	2,085	781	13	205	4,472
1985	1,322	1,916	838	11	214	4,301
1986	1,336	1,971	811	10	222	4,350
1987	1,347	2,118	801	13	245	4,524
1988	1,493	2,133	745	16	234	4,621
1989	1,375	2,086	708	14	245	4,427
1990	1,542	2,411	784	11	226	4,974
1991	1,488	2,342	733	11	256	4,831
1992	1,582	2,407	738	11	255	4,992
1993	1,369	2,188	607	10	249	4,423
1994	1,608	2,216	671	12	269	4,776
1995	1,503	2,236	698	10	278	4,725
1996	1,561	2,283	724	13	274	4,855
1997	1,757	2,501	705	13	294	5,270
1998	1,815	2,535	639	14	266	5,270
1999	1,674	2,443	657	19	286	5,079
2000	1,739	2,357	614	14	274	4,999
2001	1,579	1,988	664	13	268	4,512
2002	1,722	2,271	642	13	295	4,943
2003	1,728	2,385	711	12	295	5,131
2004	1,623	2,587	650	21	258	5,139
2005	1,838	2,529	700	12	277	5,356
2006	2,056	2,774	641	15	266	5,751
2007	1,961	2,628	601	14	252	5,456
2008	1,980	2,642	602	14	253	5,492
2009	1,999	2,654	603	14	255	5,526
2010	2,018	2,665	600	14	256	5,553
2011	2,036	2,672	598	15	257	5,578
2012	2,053	2,680	593	15	258	5,599
2013	2,071	2,688	588	15	259	5,621
2014	2,088	2,695	581	15	260	5,640
2015	2,106	2,702	575	15	261	5,659
2016	2,124	2,709	567	15	262	5,678
2017	2,143	2,716	560	15	263	5,697
2018	2,164	2,750	550	15	264	5,744

**Annual Growth Rates (%)**

1980-1990	3.2	4.3	0.5	3.1	1.6	3.1
1990-2000	1.2	-0.2	-2.4	2.5	2.0	0.1
2000-2005	1.1	1.4	2.6	-2.9	0.2	1.4
2005-2008	2.5	1.5	-4.9	4.8	-2.9	0.8
2008-2018	0.9	0.4	-0.9	0.7	0.4	0.4
2005-2018	1.3	0.6	-1.8	1.6	-0.4	0.5

**Form 1.4 - LADWP Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Peak Demand (MW)**

Year	Total End Use Load	Net Losses	Gross Generation	Private Supply	Net Peak Demand	Load Factor (%)
1980	3,653	409	4,062	0	4,062	58.0
1981	3,933	440	4,373	0	4,373	56.7
1982	4,024	451	4,475	0	4,475	59.3
1983	4,031	447	4,478	39	4,439	59.9
1984	4,472	494	4,966	59	4,907	55.8
1985	4,301	476	4,777	55	4,722	57.3
1986	4,350	479	4,829	76	4,753	58.5
1987	4,524	497	5,021	88	4,933	62.4
1988	4,621	503	5,124	129	4,995	56.8
1989	4,427	478	4,905	162	4,742	62.8
1990	4,974	536	5,510	184	5,326	59.7
1991	4,831	518	5,349	206	5,143	58.0
1992	4,992	537	5,529	197	5,332	56.5
1993	4,423	473	4,896	202	4,694	64.2
1994	4,776	506	5,282	260	5,022	56.5
1995	4,725	498	5,223	283	4,940	57.9
1996	4,855	515	5,369	260	5,110	58.9
1997	5,270	563	5,833	242	5,591	55.2
1998	5,270	564	5,834	231	5,603	53.0
1999	5,079	543	5,622	234	5,388	61.1
2000	4,999	536	5,535	210	5,325	66.6
2001	4,512	485	4,997	186	4,811	68.4
2002	4,943	526	5,470	243	5,227	60.8
2003	5,131	549	5,680	230	5,450	57.6
2004	5,139	553	5,692	204	5,488	58.0
2005	5,356	577	5,933	207	5,725	58.0
2006	5,751	621	6,372	208	6,164	55.0
2007	5,456	588	6,044	210	5,834	55.0
2008	5,492	591	6,083	212	5,872	55.0
2009	5,526	595	6,121	213	5,907	54.9
2010	5,553	598	6,151	215	5,936	54.9
2011	5,578	600	6,178	217	5,961	54.8
2012	5,599	603	6,202	219	5,983	54.7
2013	5,621	605	6,226	220	6,005	54.5
2014	5,640	607	6,246	222	6,024	54.4
2015	5,659	609	6,268	224	6,044	54.2
2016	5,678	611	6,288	226	6,063	54.0
2017	5,697	613	6,310	227	6,083	53.8
2018	5,744	618	6,361	229	6,132	53.5

**Annual Growth Rates (%)**

1980-1990	3.1	2.7	3.1		2.7	0.3
1990-2000	0.1	0.0	0.0	1.3	0.0	1.1
2000-2005	1.4	1.5	1.4	-0.3	1.5	-2.8
2005-2008	0.8	0.8	0.8	0.7	0.8	-1.8
2008-2018	0.4	0.4	0.4	0.8	0.4	-0.3
2005-2018	0.5	0.5	0.5	0.8	0.5	-0.6



**Form 1.7a - LADWP Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Private Supply by Sector (GWh)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	TCU	Streetlighting	Total Consumption
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	232	0	0	0	0	232
1984	0	0	350	0	0	0	0	350
1985	0	0	328	0	0	0	0	328
1986	0	0	406	0	0	44	0	450
1987	0	12	408	0	0	103	0	522
1988	0	20	605	0	0	141	0	766
1989	0	27	784	0	0	157	0	968
1990	0	37	872	0	0	188	0	1,097
1991	0	55	985	0	0	188	0	1,227
1992	0	65	933	0	0	174	0	1,172
1993	0	67	957	0	0	180	0	1,204
1994	0	284	1,070	0	0	193	0	1,548
1995	0	335	1,122	0	0	229	0	1,686
1996	0	273	1,182	0	0	93	0	1,548
1997	0	301	1,040	0	0	99	0	1,439
1998	0	302	1,040	0	0	31	0	1,373
1999	0	304	1,081	0	0	10	0	1,395
2000	0	295	951	0	0	6	0	1,251
2001	0	231	876	0	0	0	0	1,108
2002	0	266	1,128	0	0	52	0	1,446
2003	0	290	1,081	0	0	0	0	1,371
2004	0	248	966	0	0	0	0	1,214
2005	0	255	980	0	0	0	0	1,236
2006	0	256	980	0	0	0	0	1,236
2007	0	258	980	0	0	0	0	1,239
2008	0	262	980	0	0	0	0	1,243
2009	1	267	980	0	0	0	0	1,248
2010	1	274	980	0	0	0	0	1,255
2011	1	283	980	0	0	0	0	1,264
2012	1	293	980	0	0	0	0	1,274
2013	1	305	980	0	0	0	0	1,286
2014	1	318	980	0	0	0	0	1,300
2015	2	333	980	0	0	0	0	1,315
2016	2	349	980	0	0	0	0	1,331
2017	2	367	980	0	0	0	0	1,350
2018	2	387	980	0	0	0	0	1,369

**Annual Growth Rates (%)**

1980-1990				
1990-2000		22.9	0.9	1.3
2000-2005		-2.8	0.6	-0.3
2005-2008		0.9	0.0	0.2
2008-2018	17.9	4.0	0.0	1.0
2005-2018		3.2	0.0	0.8

**Form 2.2 - LADWP Planning Area**  
**California Energy Demand 2008-2018 Staff Draft Forecast**  
**Planning Area Economic and Demographic Assumptions**

Year	Population	Households	Persons per Household	Real Personal Income (Millions 2005\$)	Industrial Value Added (Millions 2005\$)
1980	2,934,374	1,132,115	2.59	27,341	12,902
1981	2,953,634	1,135,098	2.60	27,994	13,204
1982	2,986,749	1,134,109	2.63	27,968	12,795
1983	3,046,734	1,138,978	2.67	28,759	12,953
1984	3,117,622	1,149,794	2.71	30,934	13,620
1985	3,203,665	1,170,650	2.74	32,596	13,994
1986	3,294,981	1,191,439	2.77	33,874	14,184
1987	3,361,301	1,205,554	2.79	35,365	14,790
1988	3,391,782	1,216,518	2.79	36,146	15,557
1989	3,424,671	1,224,802	2.80	36,619	16,123
1990	3,426,297	1,225,849	2.80	37,601	16,469
1991	3,463,570	1,236,285	2.80	36,505	15,937
1992	3,511,438	1,245,796	2.82	36,845	15,878
1993	3,521,594	1,253,308	2.81	35,650	15,868
1994	3,515,761	1,259,852	2.79	35,728	15,791
1995	3,483,672	1,258,467	2.77	36,199	16,659
1996	3,483,860	1,261,498	2.76	36,856	16,411
1997	3,513,031	1,266,406	2.77	37,743	17,471
1998	3,542,204	1,270,477	2.79	40,631	17,603
1999	3,591,749	1,278,807	2.81	41,577	17,030
2000	3,648,476	1,284,744	2.84	43,122	17,401
2001	3,719,622	1,289,014	2.89	44,945	15,249
2002	3,778,638	1,294,161	2.92	45,511	14,711
2003	3,824,861	1,298,878	2.94	46,173	14,289
2004	3,860,633	1,305,354	2.96	47,994	15,022
2005	3,888,737	1,312,625	2.96	49,364	15,308
2006	3,908,338	1,317,149	2.97	51,505	15,553
2007	3,927,932	1,321,652	2.97	53,228	15,731
2008	3,947,526	1,326,136	2.98	54,810	16,000
2009	3,967,126	1,330,608	2.98	56,370	16,215
2010	3,986,720	1,335,059	2.99	57,771	16,364
2011	4,003,001	1,338,386	2.99	59,175	16,562
2012	4,019,286	1,341,699	3.00	60,471	16,660
2013	4,035,568	1,344,996	3.00	61,681	16,794
2014	4,051,851	1,348,283	3.01	62,864	16,837
2015	4,068,134	1,351,555	3.01	64,036	16,930
2016	4,084,413	1,354,811	3.01	65,219	16,996
2017	4,100,695	1,358,058	3.02	66,484	17,050
2018	4,116,975	1,361,289	3.02	67,795	17,056

**Annual Growth Rates (%)**

1980-1990	1.6	0.8	0.8	3.2	2.5
1990-2000	0.6	0.5	0.2	1.4	0.6
2000-2005	1.3	0.4	0.8	2.7	-2.5
2005-2008	0.5	0.3	0.2	3.5	1.5
2008-2018	0.4	0.3	0.2	2.1	0.6
2005-2018	0.4	0.3	0.2	2.5	0.8

# CHAPTER 7: NATURAL GAS DEMAND FORECAST

This chapter presents the staff draft forecasts of end-user natural gas demand for the PG&E, Southern California Gas (SCG), and SDG&E natural gas planning areas. Staff prepares these forecasts in parallel with its electricity demand forecasts. The models used by staff are organized along electricity planning area boundaries. The gas demand forecasts presented here are the aggregate of gas demand in the corresponding electricity planning areas. These forecasts do not include natural gas used by utilities or others for electric generation.

The draft CED 2008 forecasts incorporate preliminary forecasts of natural gas prices, and consumption data from 2005. See Chapter 1 for a discussion of economic and demographic assumptions.

## Forecast Results

Table 7-1 compares the statewide draft CED 2008 forecast with the CED 2006 forecast for selected years. The new forecast is lower in the near term because recorded 2005 consumption was lower than forecast in September 2005. However, overall growth throughout the forecast period is now higher as a result of the increase in commercial floor space projections discussed in Chapter 1 and increases in some parts of the industrial sector forecast.

**Table 7-1: Statewide Natural Gas Forecast Comparison**

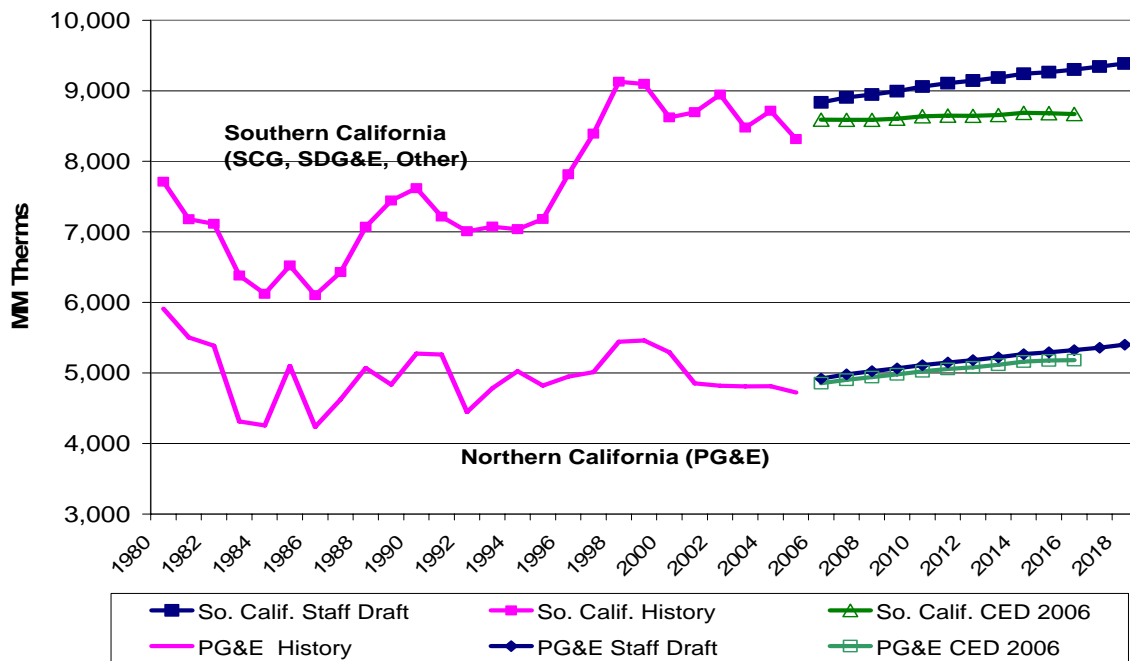
	Consumption (MM Therms)		
	CED 2006	Staff Draft	Percent Difference
1990	12,893	12,893	0.00%
2000	13,915	13,915	0.00%
2005	13,550	13,041	-3.76%
2008	13,528	13,970	3.27%
2016	13,850	14,625	5.60%
Annual Average Growth Rates			
1990-2000	0.77%	0.77%	
2000-2005	-0.53%	-1.29%	
2005-2008	-0.05%	2.32%	
2005-2016	0.20%	1.05%	
Historic values are shaded			

Figure 7-1 compares the forecast by region. Gas consumption projections in Southern California were significantly increased in the new forecast after GDP estimates were revised upward in the mining sector. Growth in this sector is now

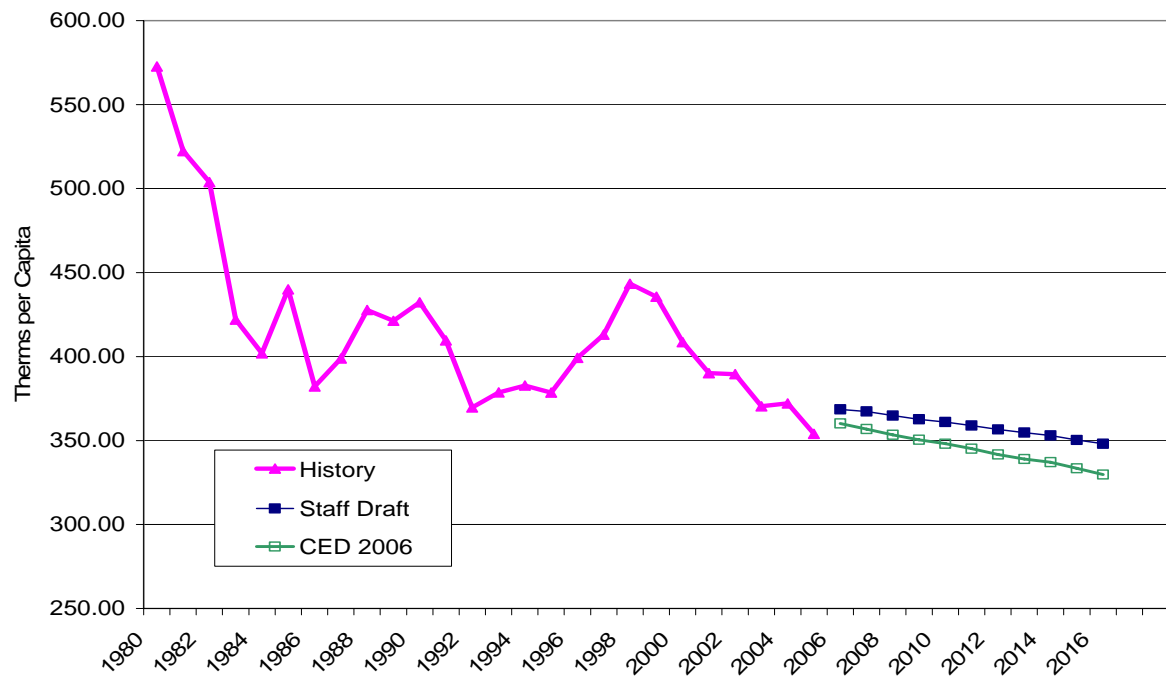
relatively flat whereas in 2006 it had been projected to decline throughout the forecast period.

Figure 7-2 compares the old and new per capita natural gas consumption forecasts. Annual per capita demand varies in response to annual temperatures and business conditions, but has generally been declining over time. Projected per capita consumption in the CED 2008 forecast has risen above the levels projected in 2006 as one would expect with increased commercial floor space growth across the state and the higher mining sector forecast in Southern California. Both forecasts, however, still project a steady decline in per capita consumption over the forecast period.

**Figure 7-1: Natural Gas Demand Forecast**



**Figure 7-2: Statewide per Capita Natural Gas Consumption**



## Planning Area Results

### *Pacific Gas and Electric Planning Area*

The PG&E natural gas planning area is defined as the combined PG&E and SMUD electric planning areas. It includes all PG&E retail gas customers and customers of private marketers using the PG&E natural gas distribution system.

Table 7-2 compares the PG&E planning area forecasts. Demand in 2005 was somewhat lower than was forecast in CED 2006. By the end of the forecast period, demand is almost three percent higher in the new forecast.

**Table 7-2: PG&E Natural Gas Forecast Comparison**

	Consumption (MM Therms)		
	CED 2006	Staff Draft	Percent Difference
1990	5,275	5,275	0.00%
2000	5,291	5,291	0.00%
2005	4,852	4,724	-2.64%
2008	4,940	5,025	1.72%
2016	5,181	5,324	2.76%
Annual Average Growth Rates			
1990-2000	0.03%	0.03%	
2000-2005	-1.72%	-2.24%	
2005-2008	0.60%	2.08%	
2005-2016	0.60%	1.09%	
Historic values are shaded			

Figure 7-3 compares the 2008 draft and CED 2006 PG&E planning area residential forecasts. The 2008 forecast is lower throughout the entire forecast period as actual consumption recorded in 2005 was lower than predicted in CED 2006, but the two forecasts have nearly the same growth rate.

**Figure 7-3: PG&E Planning Area Residential Consumption**

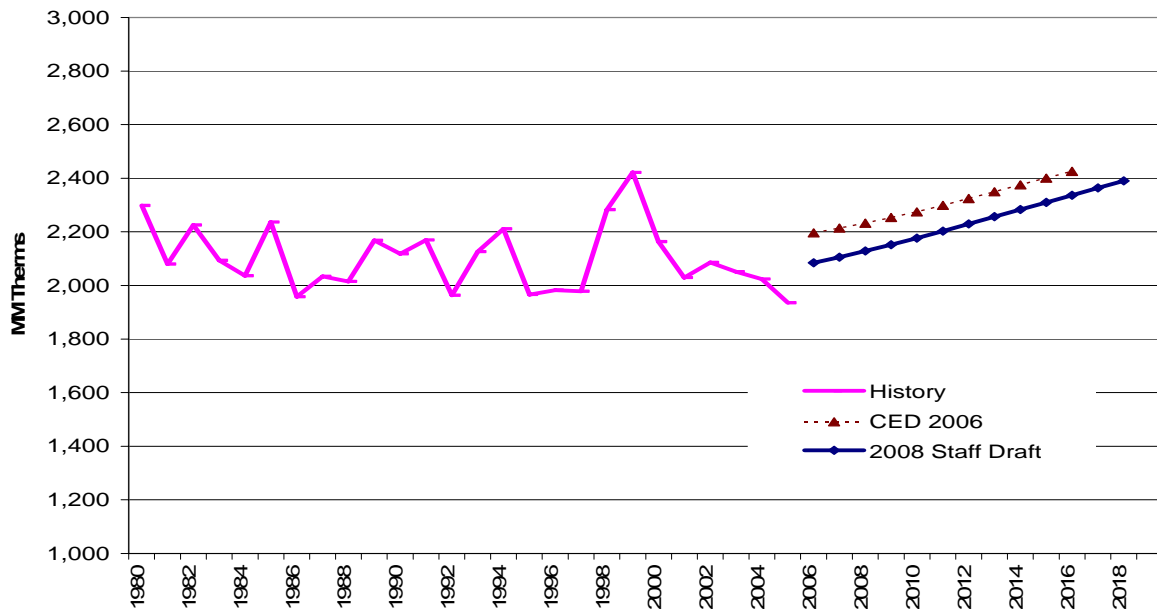


Figure 7-4 provides a comparison of the 2008 draft and CED 2006 commercial sector gas demand forecasts. Commercial gas use is now expected to rise at a similar rate to that experienced in the historical period. New commercial floor space projections described in Chapter 1 are responsible for this change.

**Figure 7-4: PG&E Planning Area Commercial Gas Demand**

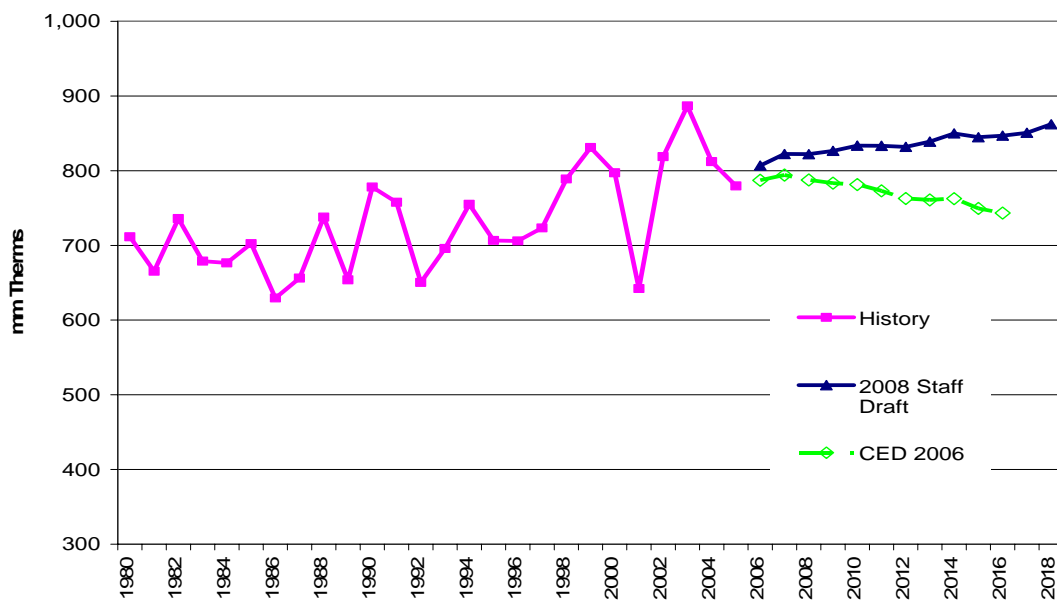
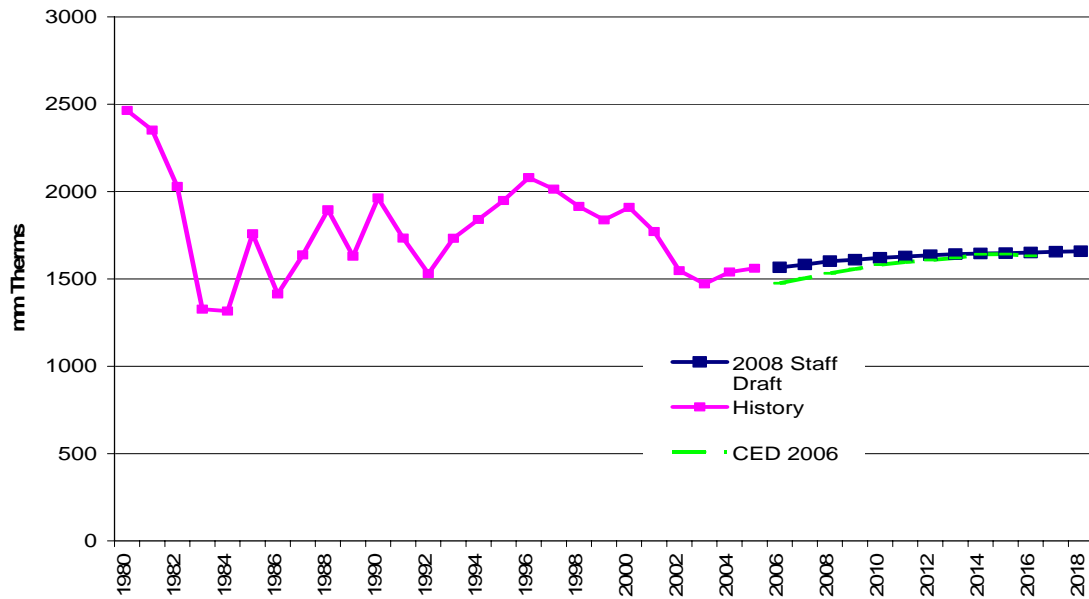


Figure 7-5 shows the new industrial forecast is relatively unchanged from 2006 with both forecasts growing at less than 1 percent per year.

**Figure 7-5: PG&E Planning Area Industrial Natural Gas Demand**





### ***Southern California Gas Company Planning Area***

The SCG planning area is comprised of the SCE, Burbank and Glendale, Pasadena, and LADWP electric planning areas. It includes customers of those utilities, plus customers of private marketers using the SCG natural gas distribution system.

Table 7-3 provides a comparison of the SCG planning area forecasts. The draft 2008 forecast grows at a much higher rate than the old forecast after revising both commercial floor space projections and mining GDP estimates significantly upward. Although total recorded gas use in the planning area was 4.5 percent lower than anticipated in 2006, by the end of the forecast period it is nearly 8 percent higher.

**Table 7-3: SCG Natural Gas Forecast Comparison**

	Consumption (MM Therms)		
	CED 2006	Staff Draft	Percent Difference
1990	6,806	6,806	0.00%
2000	7,939	7,939	0.00%
2005	8,020	7,662	-4.46%
2008	7,892	8,253	4.57%
2016	7,924	8,549	7.89%
Annual Average Growth Rates			
1990-2000	1.55%	1.55%	
2000-2005	0.20%	-0.71%	
2005-2008	-0.53%	2.51%	
2005-2016	-0.11%	1.00%	
Historic values are shaded			

Figure 7-6 provides a comparison of the residential gas demand forecasts. The new draft forecast is lower throughout the forecast period due to a lower starting point, but the growth rates are similar.

**Figure 7-6: SCG Planning Area Residential Natural Gas Consumption**

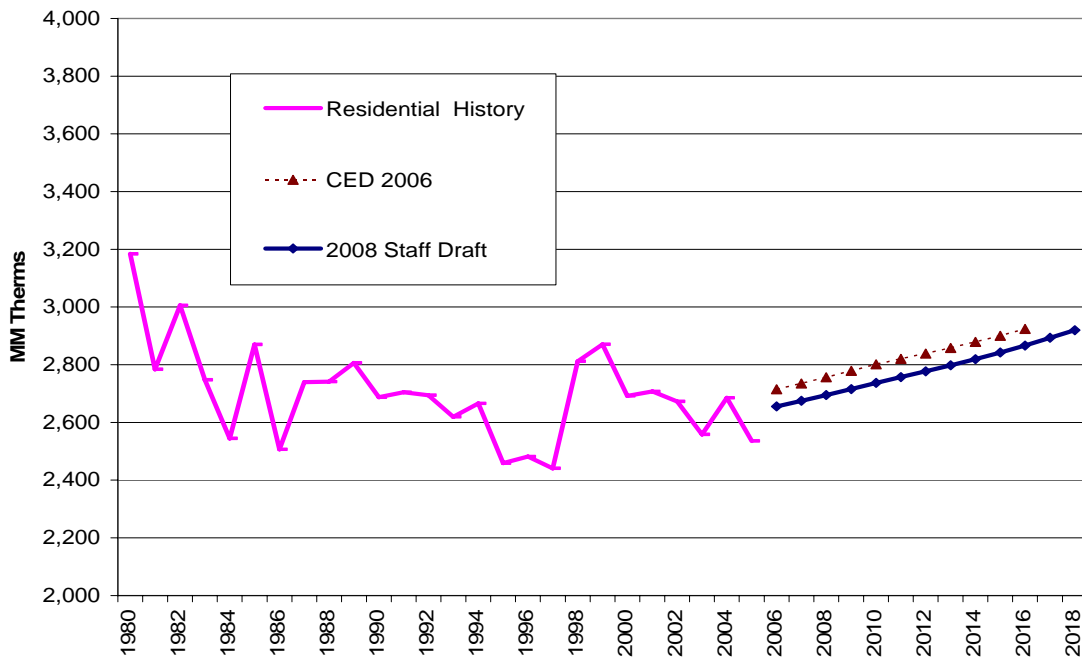
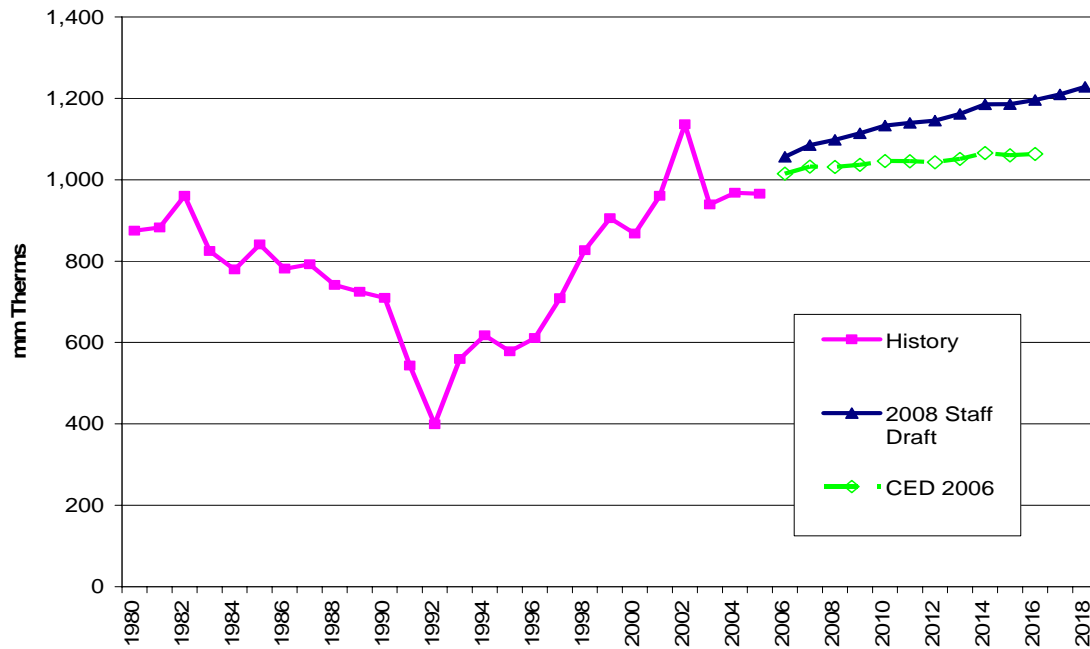
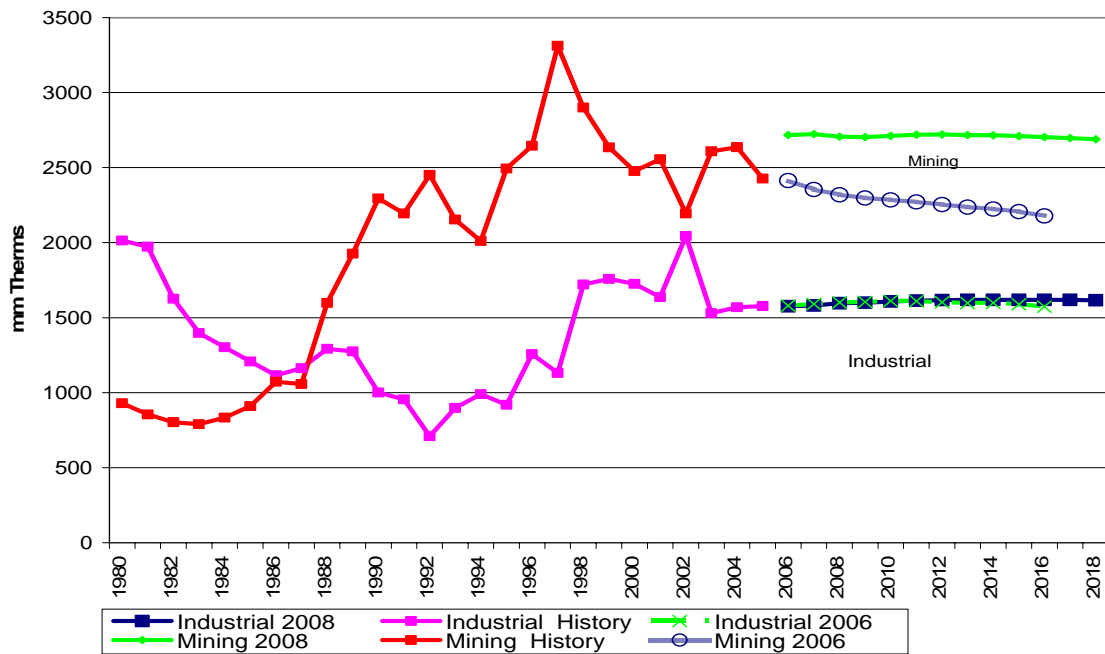


Figure 7-7 compares the commercial sector forecast, which is now expected to increase at a higher rate than in 2006. The new forecast also starts from a higher point than was predicted in 2006. Figure 7-8 shows that the industrial forecast is unchanged and is nearly flat throughout the forecast period. However, the mining sector is now predicted to stay relatively flat instead of declining over the forecast period.

**Figure 7-7: SCG Planning Area  
Commercial Natural Gas Consumption**



**Figure 7-8: SCG Planning Area  
Industrial and Mining Natural Gas Consumption**



### ***San Diego Gas and Electric Planning Area***

The SDG&E planning area contains SDG&E customers, plus customers of private marketers using the SDG&E natural gas distribution system.

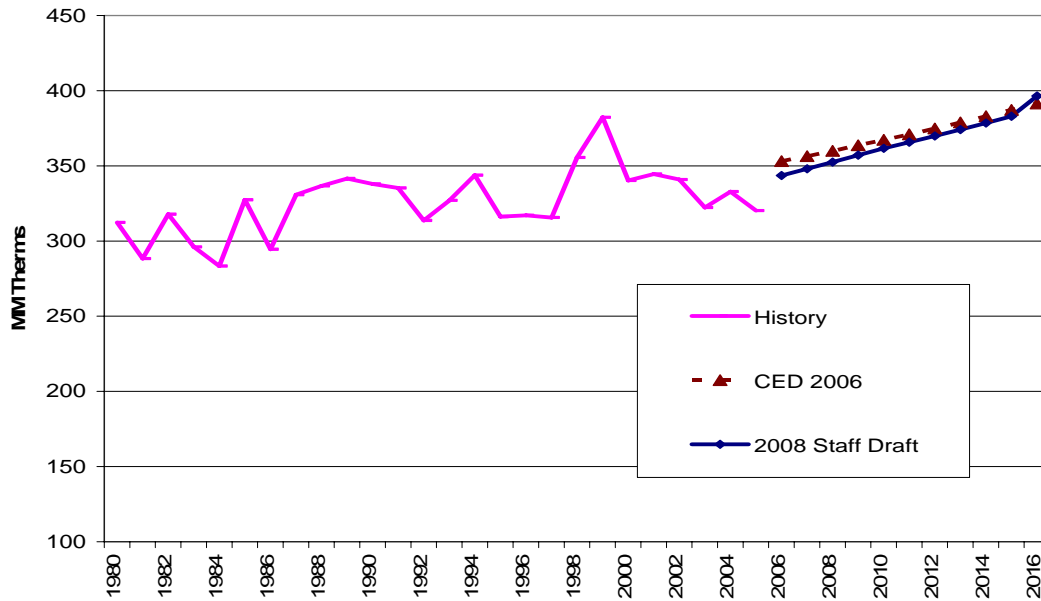
Table 7-4 shows both SDG&E planning area forecasts to be very similar. The staff draft forecast is lower in the short term because of a lower starting point than was projected in the CED 2006 forecast.

**Table 7-4: SDG&E Natural Gas Forecast Comparison**

	Consumption (MM Therms)		
	CED 2006	Staff Draft	Percent Difference
1990	517	517	0.00%
2000	566	566	0.00%
2005	549	530	-3.46%
2008	566	560	-0.96%
2016	611	620	1.42%
Annual Average Growth Rates			
1990-2000	-2.34%	0.90%	
2000-2005	-0.60%	-1.30%	
2005-2008	1.01%	1.88%	
2005-2016	0.98%	1.43%	
Historic values are shaded			

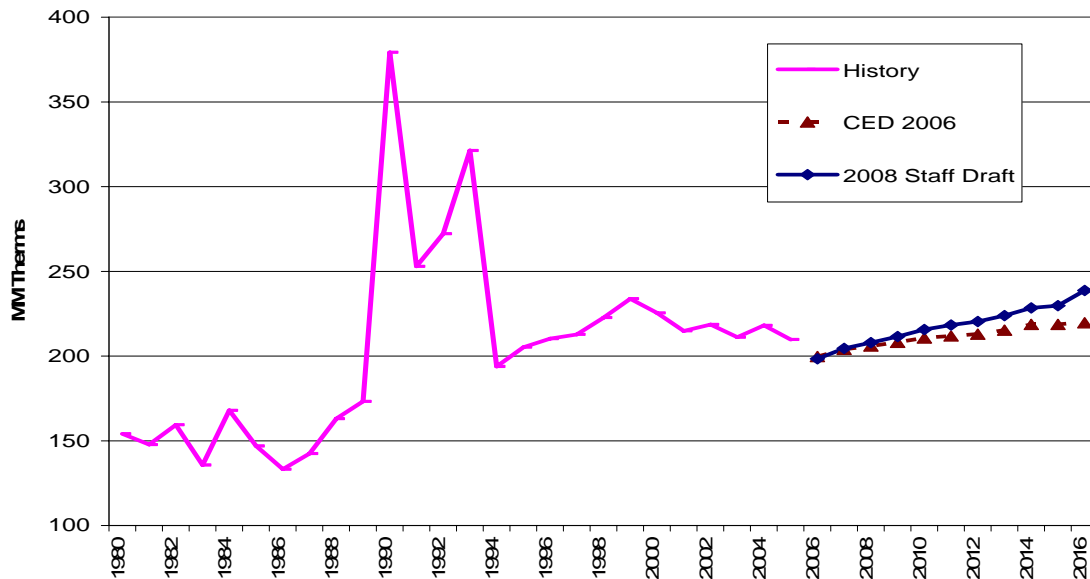
Figure 7-9 provides a comparison of the SDG&E planning area residential gas consumption forecasts. Residential consumption in 2005 was lower than forecast, but the growth rate is within one-half of 1 percent. Residential gas consumption grows at 1.43 percent throughout the forecast.

**Figure 7-9: SDG&E Planning Area Residential Natural Gas Consumption**



In the SDG&E nonresidential sector (Figure 7-10), the new draft forecast grows faster over the forecast, which is driven primarily from an increase in commercial floor space growth rates.

**Figure 7-10: SDG&E Planning Area Nonresidential Natural Gas Consumption**



**Table 7-5 - PG&E Planning Area  
California Energy Demand 2008-2018 Staff Draft Forecast  
Natural Gas Consumption by Sector (10<sup>6</sup> Therms)**

	Residential	Commercial	Industrial	Mining	Agricultural	Other	Total Consumption
1980	2,298	712	2,464	250	73	113	5,909
1981	2,079	665	2,351	228	62	116	5,503
1982	2,226	736	2,029	215	58	122	5,385
1983	2,093	679	1,326	58	49	106	4,311
1984	2,036	677	1,316	74	48	106	4,256
1985	2,236	702	1,758	234	52	114	5,096
1986	1,958	630	1,413	89	46	101	4,237
1987	2,034	656	1,637	148	50	101	4,626
1988	2,015	738	1,895	207	56	159	5,070
1989	2,168	654	1,630	216	59	108	4,834
1990	2,118	778	1,962	238	65	114	5,275
1991	2,169	758	1,733	418	60	122	5,260
1992	1,963	651	1,530	162	50	90	4,445
1993	2,126	696	1,732	96	40	95	4,786
1994	2,211	755	1,840	71	52	98	5,027
1995	1,966	707	1,948	77	47	76	4,821
1996	1,982	706	2,080	44	55	81	4,948
1997	1,978	723	2,014	163	64	67	5,010
1998	2,283	789	1,914	319	70	67	5,442
1999	2,422	831	1,837	236	71	64	5,461
2000	2,164	797	1,909	288	79	55	5,291
2001	2,029	642	1,771	295	50	67	4,854
2002	2,086	819	1,547	272	59	35	4,818
2003	2,051	887	1,471	268	85	49	4,811
2004	2,024	812	1,539	304	65	68	4,812
2005	1,935	780	1,560	329	41	79	4,724
2006	2,085	807	1,566	343	41	80	4,921
2007	2,106	822	1,583	349	41	80	4,981
2008	2,128	822	1,601	351	41	81	5,025
2009	2,152	827	1,610	354	41	81	5,065
2010	2,176	834	1,621	357	41	82	5,111
2011	2,203	834	1,628	359	41	83	5,147
2012	2,230	832	1,635	361	41	83	5,181
2013	2,257	839	1,641	362	41	84	5,223
2014	2,283	850	1,645	363	41	84	5,266
2015	2,310	845	1,647	363	41	85	5,291
2016	2,337	847	1,651	364	41	85	5,324
2017	2,363	851	1,655	364	41	86	5,359
2018	2,390	862	1,658	363	41	86	5,401

**Annual Growth Rates (%)**

1980-1990	-0.8	0.9	-2.3	-0.5	-1.2	0.1	-1.1
1990-2000	0.2	0.2	-0.3	1.9	1.9	-6.9	0.0
2000-2005	-2.2	-0.4	-4.0	2.7	-12.3	7.3	-2.2
2005-2008	3.2	1.8	0.9	2.1	0.0	1.0	2.1
2008-2018	1.2	0.5	0.4	0.3	0.0	0.6	0.7
2005-2018	1.6	0.8	0.5	0.8	0.0	0.7	1.0

**Table 7-6 - SCG Planning Area  
California Energy Demand 2008-2018 Staff Draft Forecast  
Natural Gas Consumption by Sector (10<sup>6</sup> Therms)**

	Residential	Commercial	Industrial	Mining	Agricultural	Other	Total Consumption
1980	3,184	875	2,014	930	71	94	7,168
1981	2,784	883	1,973	854	80	102	6,676
1982	3,006	961	1,626	803	70	111	6,577
1983	2,747	825	1,398	790	50	88	5,898
1984	2,545	779	1,303	834	54	84	5,599
1985	2,870	841	1,208	910	53	83	5,965
1986	2,507	782	1,115	1,073	44	80	5,600
1987	2,740	792	1,164	1,058	44	78	5,875
1988	2,741	742	1,292	1,598	44	69	6,487
1989	2,806	725	1,276	1,927	41	64	6,838
1990	2,687	710	1,002	2,295	45	67	6,806
1991	2,705	543	954	2,194	34	109	6,539
1992	2,694	399	710	2,452	26	47	6,329
1993	2,620	559	899	2,153	33	58	6,322
1994	2,666	617	990	2,011	44	62	6,390
1995	2,459	578	919	2,494	40	67	6,557
1996	2,482	611	1,257	2,646	48	130	7,174
1997	2,441	709	1,132	3,311	63	87	7,743
1998	2,812	827	1,721	2,900	69	87	8,416
1999	2,870	905	1,757	2,635	87	92	8,347
2000	2,692	867	1,725	2,476	90	87	7,939
2001	2,707	960	1,637	2,556	86	74	8,021
2002	2,673	1,136	2,045	2,195	114	99	8,261
2003	2,558	939	1,529	2,608	102	77	7,815
<b>2004</b>	<b>2,685</b>	<b>968</b>	<b>1,569</b>	<b>2,636</b>	<b>101</b>	<b>66</b>	<b>8,025</b>
2005	2,536	966	1,578	2,427	85	71	7,662
2006	2,656	1,057	1,576	2,717	85	72	8,162
2007	2,675	1,085	1,581	2,723	85	73	8,221
2008	2,695	1,098	1,595	2,706	85	73	8,253
2009	2,715	1,114	1,600	2,703	85	74	8,292
2010	2,737	1,133	1,608	2,712	85	75	8,349
2011	2,757	1,140	1,613	2,720	85	76	8,390
2012	2,777	1,145	1,617	2,721	85	77	8,421
2013	2,798	1,162	1,618	2,717	85	77	8,458
2014	2,819	1,185	1,619	2,715	85	78	8,501
2015	2,842	1,186	1,619	2,710	85	79	8,520
2016	2,866	1,196	1,618	2,704	85	80	8,549
2017	2,894	1,210	1,618	2,697	85	80	8,583
2018	2,920	1,228	1,615	2,689	85	81	8,618

**Annual Growth Rates (%)** 0.126018157

1980-1990	-1.7	-2.1	-6.7	9.5	-4.4	-3.3	-0.5
1990-2000	0.0	2.0	5.6	0.8	7.2	2.7	1.6
2000-2005	-1.2	2.2	-1.8	-0.4	-1.2	-4.1	-0.7
2005-2008	2.0	4.4	0.4	3.7	0.0	1.1	2.5
2008-2018	0.8	1.1	0.1	-0.1	0.0	1.0	0.4
2005-2018	1.1	1.9	0.2	0.8	0.0	1.0	0.9

**Table 7-7 - SDG&E Planning Area  
California Energy Demand 2006-2016 Staff Forecast  
Natural Gas Consumption by Sector (10<sup>6</sup> Therms)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	Other	Total Consumption
1980	312	90	40	1	9	14	466
1981	288	86	39	1	8	14	436
1982	318	89	46	2	4	18	477
1983	296	88	27	2	5	13	432
1984	283	90	51	3	5	19	451
1985	327	89	36	3	4	15	474
1986	295	78	35	4	3	13	428
1987	331	78	43	5	4	14	473
1988	337	92	44	6	4	17	500
1989	342	92	52	7	4	18	515
1990	338	160	172	8	6	33	717
1991	335	136	82	6	5	23	588
1992	314	143	94	6	4	26	586
1993	327	174	104	5	8	30	648
1994	344	108	60	4	6	16	538
1995	316	118	62	4	6	16	521
1996	317	114	63	6	8	20	527
1997	316	173	29	1	3	7	528
1998	356	127	68	2	7	18	578
1999	382	136	68	2	8	20	616
2000	340	87	125	2	3	9	566
2001	345	150	38	2	6	19	559
2002	341	153	40	3	7	16	559
2003	322	152	34	6	6	14	533
2004	342	155	30	5	6	13	551
2005	321	159	27	5	5	13	530
2006	344	145	27	7	5	13	542
2007	348	150	28	8	5	13	553
2008	352	153	28	8	5	13	560
2009	357	156	28	8	5	14	569
2010	362	160	29	8	5	14	577
2011	366	162	29	8	5	14	584
2012	370	163	30	8	5	14	590
2013	374	167	30	8	5	14	598
2014	379	171	30	8	5	15	607
2015	383	172	30	8	5	15	613
2016	387	174	31	8	5	15	620
2017	392	177	31	8	5	15	627
2018	396	180	31	7	5	15	635

**Annual Growth Rates (%)**

1980-1990	0.8	5.8	15.7	22.9	-3.4	9.3	4.4
1990-2000	0.1	-5.8	-3.2	-13.5	-7.7	-12.6	-2.3
2000-2005	-1.2	12.7	-26.5	22.7	13.4	8.4	-1.3
2005-2008	3.2	-1.3	1.5	16.9	0.0	1.5	1.9
2008-2018	1.2	1.6	1.0	-1.3	0.0	1.2	1.3
2005-2018	1.6	1.0	1.2	2.7	0.0	1.3	1.4



**Table 7-8 - Other Planning Area  
California Energy Demand 2006-2016 Staff Forecast  
Natural Gas Consumption by Sector (10<sup>6</sup> Therms)**

Year	Residential	Commercial	Industrial	Mining	Agricultural	Other	Total Consumption
1980	46	21	2	0	1	6	77
1981	43	18	1	0	1	2	65
1982	40	15	1	0	1	2	59
1983	33	16	1	0	1	2	52
1984	47	20	1	0	1	2	71
1985	59	22	1	1	1	2	84
1986	50	21	0	0	0	2	75
1987	62	16	0	0	0	1	81
1988	63	20	0	0	0	1	86
1989	69	19	1	1	1	1	91
1990	72	19	1	1	1	1	95
1991	61	24	1	1	1	1	88
1992	67	16	8	1	0	2	94
1993	72	17	10	1	0	3	102
1994	75	19	9	3	0	3	109
1995	71	14	11	4	0	2	103
1996	70	20	16	4	0	3	113
1997	76	21	17	4	0	3	121
1998	91	23	14	3	0	3	134
1999	86	22	17	4	0	3	132
2000	75	17	21	4	0	3	119
2001	78	20	15	2	0	2	117
2002	80	20	17	3	0	3	125
2003	84	23	16	4	0	3	130
2004	99	26	8	3	1	3	140
2005	93	25	2	1	0	3	125
2006	96	26	5	2	0	3	132
2007	96	26	5	2	0	3	132
2008	96	26	5	2	0	3	132
2009	96	26	5	2	0	3	132
2010	96	26	5	2	0	3	132
2011	96	26	5	2	0	3	132
2012	96	26	5	2	0	3	132
2013	96	26	5	2	0	3	132
2014	96	26	5	2	0	3	132
2015	96	26	5	2	0	3	132
2016	96	26	5	2	0	3	132
2017	96	26	5	2	0	3	132
2018	96	26	5	2	0	3	132

**Annual Growth Rates (%)**

1980-1990	4.6	-1.0	-9.1	6.6	-7.4	-15.1	2.1
1990-2000	0.4	-1.4	40.5	19.6	-11.5	9.1	2.3
2000-2005	4.3	8.5	-38.2	-20.6	9.6	3.0	0.9
2005-2008	1.1	0.5	39.6	23.3	13.2	-0.9	2.0
2008-2018	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2005-2018	0.2	0.1	8.0	4.9	2.9	-0.2	0.5